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City of Hamilton

Commercial Market Analysis

Upper James South Mountain Study

MILLER O'DELL & PAUL
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St. Catharines • Burlington • Ancaster

UPPER JAMES STREET - SOUTH MOUNTAIN MARKET STUDY

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FINAL REPORT
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CHAPTER 1

INTRODUCTION AND SUMMARY

PURPOSE AND SCOPE

The purpose of this study is to conduct a Commercial Market Analysis of the Upper James South Mountain (UJSM) area of the City of Hamilton. The study area is delineated in Figure 1.

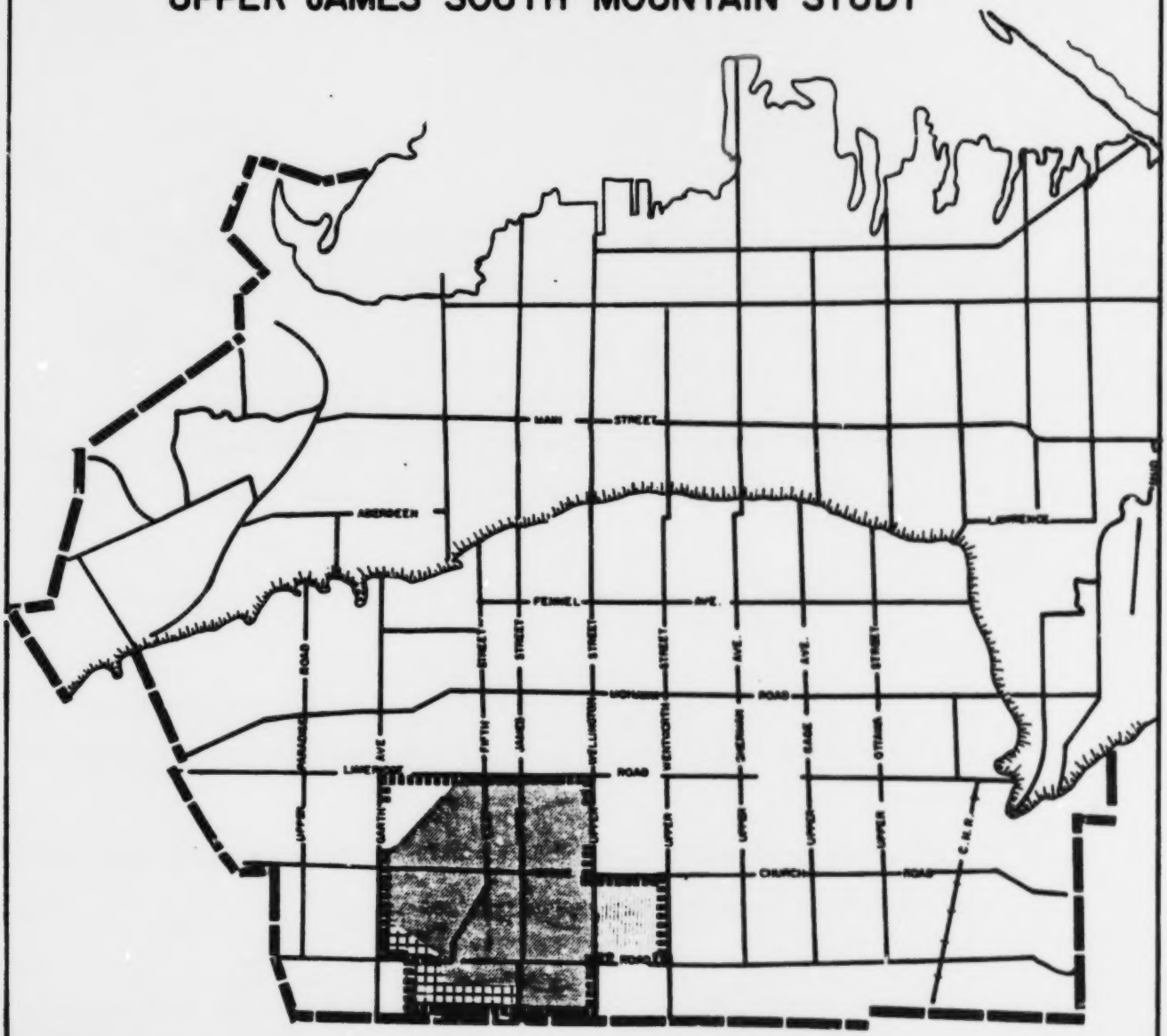
The commercial market analysis is a part of the phase 1 component of the larger UJSM study. The overall objectives of the larger study have been stated as:

- to demonstrate the need for the acceleration of services throughout the study area;
- to assess the implications of this acceleration on the existing and planned land use patterns with particular emphasis on the market potential for commercial development; and
- to define the appropriate land use pattern and implementation mechanism, which will maximize on the area's development potentials.

The finding of the UJSM study will be used to determine the advisability of amending both the Regional and City Official Plans to transfer those lands in the study area from Stage 2 to Stage 1 for servicing and development purposes. The study should demonstrate that accelerating the timing of development will have no significant impact on regional servicing priorities and can be supported by existing community facilities.

Figure 1

STUDY AREA
UPPER JAMES SOUTH MOUNTAIN STUDY



0 ½ 1 2 3

SCALE IN KILOMETRES

STUDY AREA

STAGE ONE

STAGE TWO

STAGE THREE

SOURCE: SCHEDULE 'E' STAGING OF DEVELOPMENT, PLAN CITY OF HAMILTON OFFICIAL PLAN

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The Phase 1 component, which is the Commercial Demand/Preliminary Engineering Alignment, is a critical component of the larger UJSM study and will directly affect the successive phases of the study. With respect to the precise purpose of the Commercial Market Analysis, the commercial market opportunity within the study area will be determined for the planning period (to 2001) by:-

- *measuring the extent of the demand for commercial development;*
- *identifying the types of commercial land uses required to meet that demand; and,*
- *assessing the impact of that demand on the existing and planned inventory of commercial activities in the City and neighbouring area municipalities (e.g. Glanbrook and Ancaster);*

In parallel with the commercial market component, the Regional Municipality of Hamilton-Wentworth Planning and Development Department will examine the appropriate alignment for piped services throughout the study area and will also commence preliminary neighbourhood planning in two (Ryckmans and Jerome) of the 9 neighbourhoods within the study area.

The findings of the commercial market analysis will then be used either to terminate the UJSM study due to a lack of demand or otherwise to continue with the study as a result of proven demand.

STUDY METHOD

The study method to be used in this analysis is based on a computer model developed in the Geography Department of McMaster University by one of the authors of this study.

A major feature of the model is the prediction of the size of commercial facilities throughout most of the Regional Municipality. Two improvements over standard models traditionally used for commercial market analysis include the modeling of links between trips used for different kinds of purposes (multi-stop multi-purpose trips) and secondly, by modeling the expansion or loss of trade of various commercial centres. In consideration of the multi-stop multi-purpose trips, the model determines the share of each commercial centre of the total expenditure of grocery and non-grocery purchases. The model balances the attractiveness of each centre with the inflow of consumer expenditure to that facility. Of course, normal considerations such as population growth, employment growth, consumer expenditures and sales volumes per square metre are features which are contained within the model as well. (See Chapters 3 and 4)

Another facet of the study is a socio-economic analysis of the mountain area (above the escarpment) of Hamilton and Glanbrook and including Ancaster as set out in the study terms of reference. (See Chapter 2)

The impact on commercial activity of the expanded airport is more difficult to predict. Available information pertaining to the historic impact of airports on commercial activity and other related information has been reviewed and included in this report. (See Chapter 5)

The study team has analyzed the findings of the various study components and has made recommendations pertaining to the commercial demand within the study area. The conclusions and recommendations of the study are described in the following section.

SUMMARY AND RECOMMENDATIONS

The study analyses the future projections of population for the Region of Hamilton-Wentworth and the City of Hamilton, concluding that the commercial market analysis should be based on a regional population of 445,000 and a city population of 302,000 by 2001.

Further, two key assumptions concerning expenditures and travel are made:

1) The growth in the sales of merchandise (per square metre) is assumed to be at the same rate as the growth in expenditures.

2) Improvements in the Hamilton Mountain area transportation facilities are assumed to be carried out over the planning period as set out in the Official Plan.

This "scenario" (a projection of the future) was selected as being the most reasonable among the range of pessimistic to optimistic forecasts of population, expenditures and travel network.

The study also reviews the impact on commercial growth anticipated by the expansion of the Hamilton Civic Airport.

Accordingly, the following is recommended:

1. That the following additional commercial facilities be provided by the year 2001

shops and personal services	4000 square metres (m^2)
food/beverage establishments	17 in total
automotive uses	5 in total

("Shops" include retail outlets selling department store type merchandise and food type items.)

2. No significant shop and personal service development is required until after the year 1995. For food/beverage and automotive establishments, some earlier development could be sustained.

Earlier and/or more extensive development of commercial facilities in the UJSM area can be sustained only at the expense of sales in facilities that already exist.

3. Some food/beverage and automotive facilities should be provided as a strip development, serving not only local UJSM residents, but also traffic passing along James Street and through the area. The other food/beverage and automotive uses and shops/personal services can be provided as a small mall (a supermarket, pharmacy, bank and one or two other such stores) or plaza.

4. No significant commercial development will be generated by airport activity and expansion. Any commercial activity that is realized should be used solely to reinforce existing or otherwise required commercial activity. Any hotel development applications in the UJSM area should be supressed in favour of downtown hotels.

CHAPTER 2

AREA DESCRIPTION AND DEVELOPMENT

AN OVERVIEW

The UJSM study area consists of a land area of about 510 hectares on the south mountain (Niagara Escarpment) and lying within the City of Hamilton. This land area at the present time (1984) is largely undeveloped except for several older post 1950 residential subdivisions with very limited strip type highway commercial development at several locations along Upper James Street. The undeveloped land within the area is either vacant or used for agriculture, mostly cash crop purposes.

The UJSM Area is contained within 9 neighbourhoods as set out in the City of Hamilton Official Plan. The entire Area is located within Stages 2 and 3 of the development policy in the Official Plan (See Figure 1).

The UJSM Area comprises 10% of the South Maintain land area. The South Mountain area is that portion of the City that lies south of the East-West Transportation Facility and totals about 5,700 hectares in area. The South Mountain area, surrounding and including the UJSM Area, has and will continue to exhibit development pressures as both the population of the City and the number of households increase.

Although a modest amount of growth has proceeded south along Upper James, in general, growth in the UJSM area has been largely limited due to the lack of municipal sanitary sewage facilities since the annexation of the former Barton Township by the City of Hamilton. This lack of sanitary sewers is further complicated by the natural watershed of the area which is different from that of the adjacent developed area to the north. This, of

course, adds additional complications and expense to any proposed servicing scheme, hence the current Phase 2 and 3 development priority contained in the Hamilton Official Plan.

Four significantly large development proposals have been received by the City and the Township of Glanbrook in or near the UJSM Area since the summer of 1983. The first is an application by Dominion Stores Ltd. within the Mewburn Neighbourhood in the UJSM Area which proposes an 18,580 square metre shopping centre and 200-unit hotel complex. The second is an application by M. Wasserman to develop a substantial 100-room hotel-recreation-commercial complex on a 25 hectare site fronting on Upper James Street just south of the UJSM area in Glanbrook. The third is a proposal by Berksin Property Developments Ltd. for a 600-unit "adult life style residential community" on 44.9 hectares of land located immediately west of the UJSM Area, south of Rymal Road, partly in Hamilton and partly (1/2) in Glanbrook Township. The fourth is a residential subdivision application composed of 116 single dwellings and 1.497 hectares of neighbourhood commercial proposed by A. Frisina and located immediately west of the UJSM Area, north of Rymal Road in Hamilton.

The recommendations of this study are determined by computing space needs in the year 2001 and subtracting the space now provided. The difference is the retail and commercial space that needs to be developed. Therefore, if the Dominion, Wasserman and Frisina applications are approved and go ahead, they will cause a reduction in the other space that needs to be developed by 2001. Equally, the Berksin and Frisina residential developments are treated in this study as being an integral part of the process of satisfying the housing needs which will be required by 2001.

Further to the earlier mention of the Hamilton Airport, expanding airport activity may create additional demand for commercial development opportunity, particularly for

retail service and hospitality facilities. It should be noted at the outset that this demand will not be significant. This demand cannot totally be allocated to the UJSM area as some will likely locate in Glanbrook-Mount Hope area.

SOCIO-ECONOMIC CHARACTERISTICS(1)

The Mountain Area which is that portion of the City south of the Escarpment and including Ancaster and Glanbrook, contains 27.4% of the Hamilton Census Metropolitan Area (CMA) population (1981 Census of Canada) and 32.8% of the CMA land area (see Figure 2). It should be noted both Burlington and Grimsby are included in the Hamilton CMA. The population density is slightly less (333.20 persons per square kilometre) than in the CMA as a whole (399.0 persons per square kilometre).

Seventy-five percent of the CMA and Mountain Area population was born in Canada and 56 percent of those were of British Ethnic origin. A greater proportion of the Mountain Area population (62.2%) were non-movers (have not moved into the CMA in the last 5 years) in comparison with the CMA (56%).

The proportion of English speaking people is marginally higher in the Mountain Area Census Tract (82.2%) than the CMA (79.7%). Italian is the second most prevalent Mother Tongue both within the Mountain Area and in the CMA (5% both).

The Mountain Area has a higher percentage of owned private dwellings (75%) than the CMA (63%). In addition, the average number of people per household is higher in the Mountain Area (3.05 persons per household, CMA - 2.8 persons per household).

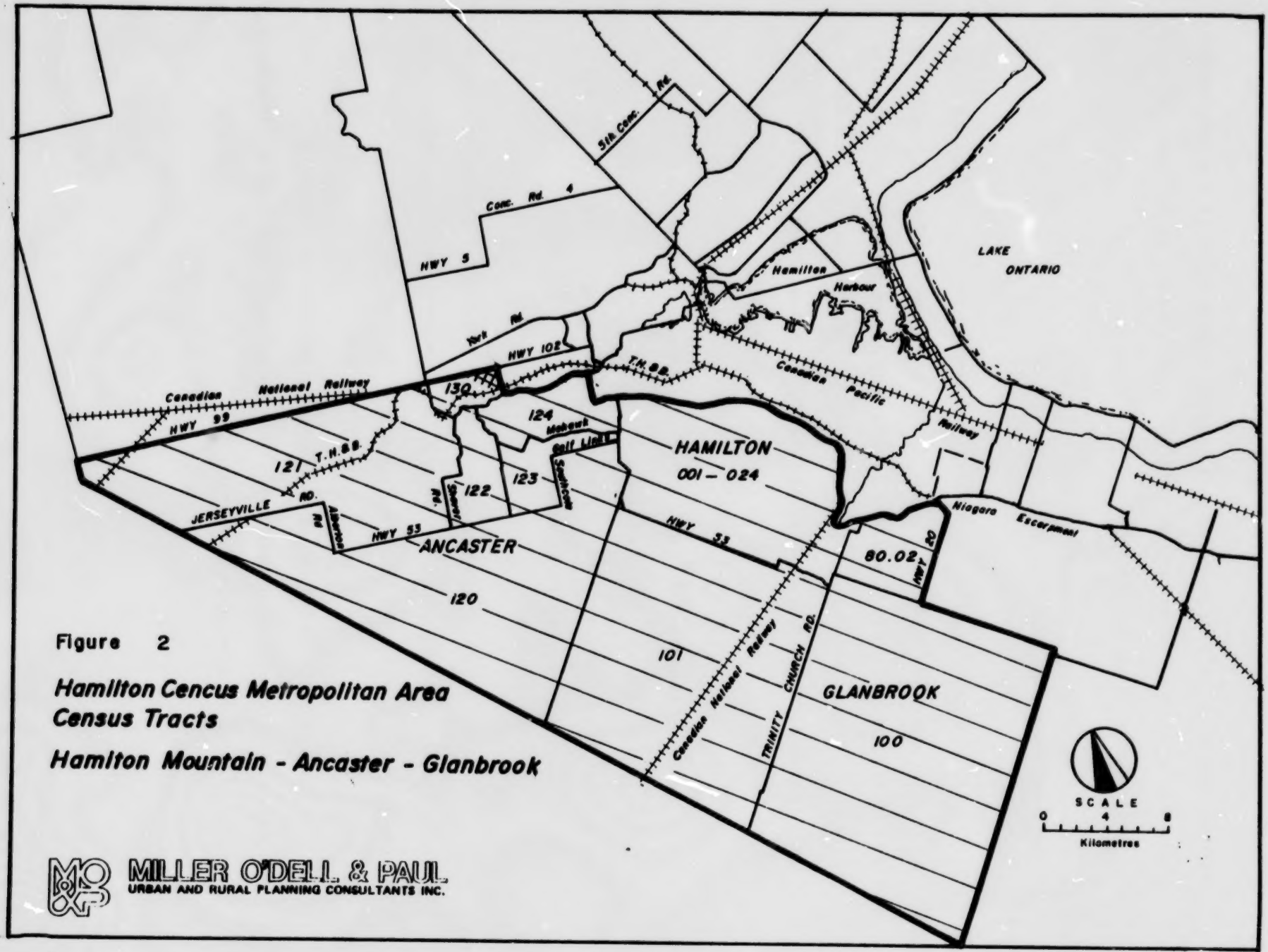

Figure 2

Hamilton Cencus Metropolitan Area
Census Tracts

Hamilton Mountain - Ancaster - Glanbrook

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The educational level and average income are slightly higher in the Mountain Area. The average family income in the Mountain Area is $29,130 compared with $28,199 in the CMA.

The Mountain Area closely reflects the character of the Hamilton CMA with the exception of the above noted characteristics. The percentage distribution of labour among the Standard Industrial Classification (2) categories is the same within the CMA and Mountain Area. The percentage of males (95%) and females (94%) 15 years and older employed and the percentage of those participating (81% and 54% respectively) in the labour force is similarly the same.

In general, the Mountain Area can be characterized as a stable area containing an English speaking rural and urban population with reasonably high incomes and educational levels living in predominantly privately-owned dwellings containing 3 persons with an average of 1.4 children per family.

(1) Hamilton Census Tracts 1981, Statistics Canada, Catalogue numbers 95-911, 95-972.

(2) This is a standard definition of industrial uses for statistical comparison.

CHAPTER 3

MARKET DEMAND ANALYSIS: METHODS

In this study, the demand for and effect of commercial development in the UJSM study area are analyzed by means of a model developed by one of this report's authors. These analyses are reported in this and the following chapters. In this chapter, the model is described briefly and the assumptions that underlie the projections are outlined. The following chapter presents the results of the analyses: expected sizes of commercial facilities, trade areas, impact on other facilities and types of activities in the new development.

This chapter has two main parts. In the first, the method of analysis is briefly described; secondly, the projections are outlined. The Appendix contains a more technical version of these two chapters.

Our task is to predict the space requirements for the following five types of commercial activity:

1. Food Type Shops (e.g. supermarkets, butchers, delicatessens, bakeries, health food shops: see Table 4 of the Appendix);

2. Department Store Type Merchandise (DSTM) shops (such as department stores, all types of clothing and shoe stores, furniture stores,, lighting stores, appliance stores, record shops, paint and wallpaper retailers, hardware stores, sporting goods stores, hobby and gift shops, jewellers: see Table 3 of the Appendix);

3. *Food and Beverage establishments (bars, taverns, restaurants, take-out food stores, donut shops and the like);*

4. *Automotive Facilities (auto sales, gas stations, parts and repairs); and*

5. *Personal Service establishments (e.g. banks, hairdressers, drycleaners, shoe repairers, pharmacies).*

The approach used to carry out this task employs a computer model to estimate the space needs for the Food Type and DSTM Shops and analyses separately the space needs for Food and Beverage, Automotive and Personal Service establishments based on the computer findings and known relationships between the five categories.

(i) *space needs for the Regional Municipality,*

(ii) *allocate this space to shopping centres, and*

(iii) *measure new space requirements by subtracting actual existing commercial space from the allocated space. Unfortunately, a comprehensive survey of existing space availability has been completed only for food and DSTM establishments (Secondary Plan Commercial Design Standards Study, Hamilton-Wentworth Planning and Development Department). Hence a slight modification of this modelling procedure has to be followed for food/beverage, automotive and personal service needs.*

THE MODEL

The model uses a zoning scheme that is almost identical to the "macro traffic

Figure 3

The Regional Municipality of Hamilton - Wentworth

TRAFFIC ZONE SYSTEMS

LEGEND

23 Macro Traffic Zones

Outside Model Study Area

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zones" employed by the Regional Municipality of Hamilton-Wentworth. The Region and its traffic zones are shown in Figure 3. Some definitions are important:

- *the "UJSM area" is shown on Figure 1;*

- *the "Model Study area" is the unshaded area on Figure 2 (this is the area for which the household survey was conducted to build and test the model);*

- *Dundas (zones 6 and 7) is called zone 67 in the tables that follow;*

- *Ancaster (zones 8 and 9) is called zone 89 in the tables that follow;*

- *Stoney Creek (zones 14 and 15 are in the model: study area) is called zone 45 in the tables that follow;*

- *zones 23 and 24 (East Hamilton and the Beach Strip) are combined here as zone 23;*

- *the "Mountain" is zones 25-30, above the escarpment;*

- *the "North Mountain" is zones 25, 26, 27, along the escarpment;*

- *the "South Mountain" is zones 28, 29 and 30, south of Limeridge Road.*

In total there are 17 zones.

In terms of Figure 3, the UJSM study area is split along the boundary between zones 28 and 29. The model allocates commercial facilities to zones, but the model does

not decide where within these zones the facilities should be located. In this respect, the access provided by the James Street route makes UJSM a logical place for any development that is required.

The model is run for two distinct times. In the first place, the short run demand for and effects of commercial development are assessed by making projections for the year 1989. Secondly, a more long run assessment is made by making projections for the year 2001, which is the time horizon for the Hamilton Official Plan.

The approach, including the model, needs as inputs the following data:

1. Distribution of population and income by zones for 1989 and 2001. These data represent the sources of demand for commercial facilities.

2. Travel times between zones. These travel times measure the difficulty in moving from an origin to a destination. They must reflect not only present conditions but also expected transport improvements.

3. Distribution of employment by zones for 1989 and 2001. The model takes into account not only people's shopping purchases on primarily shopping trips, but also their purchases on trips to and from work. Therefore, it must be told where workplaces are and how trips combine different kinds of activities.

4. Estimates of average expenditures per capita upon Food Type, DSTM, Food/Beverage and Personal Services and of the sales per square metre (psm) in facilities for 1989 and 2001.

Given inputs 1-4, the model predicts what share of the Hamilton area's sales will

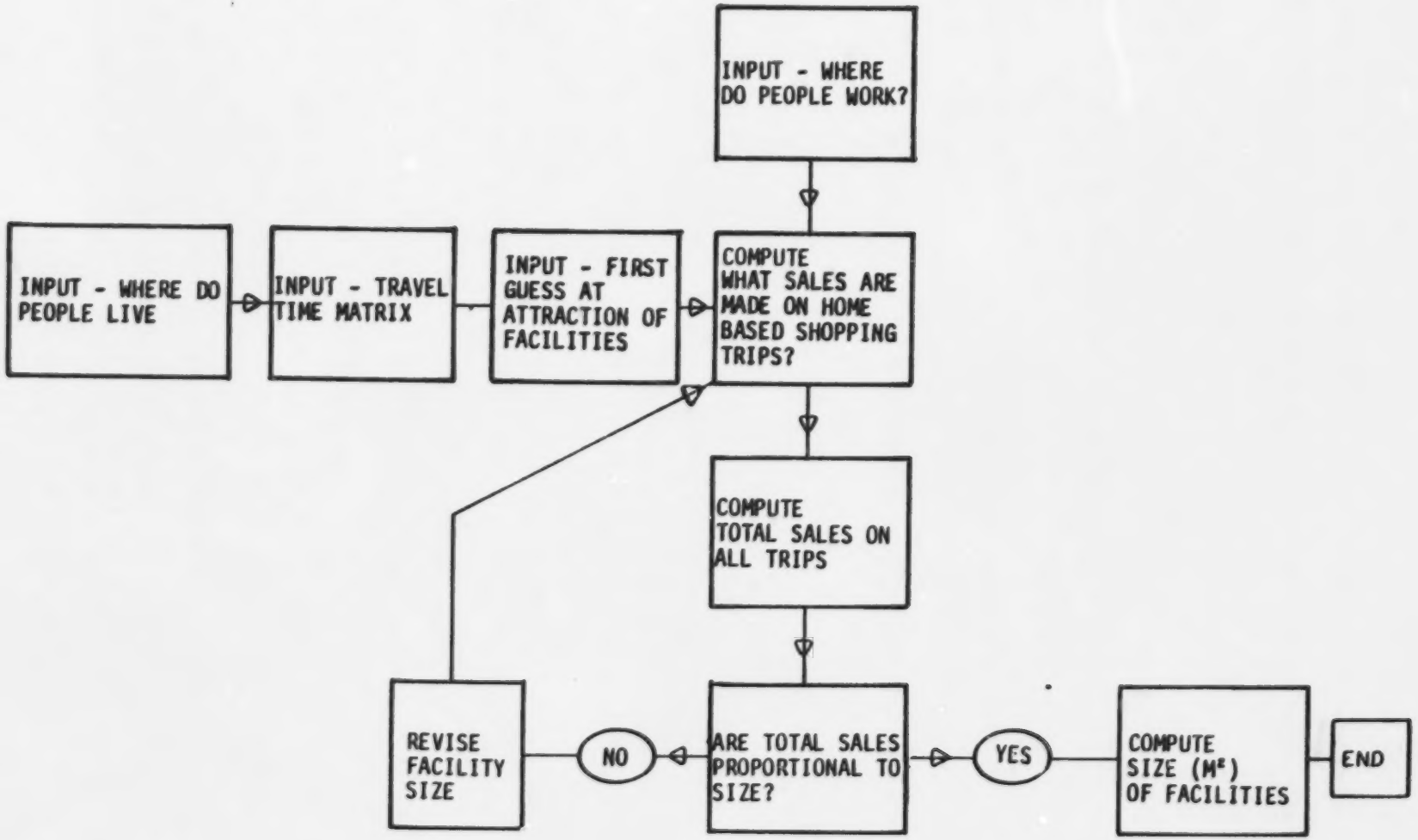
be made by commercial facilities in each of the 17 zones. This share is computed on the assumption that the commercial facilities in each zone will adjust their size, standards, range of stores, quality and so forth in order to achieve an "equilibrium" – that is, so that the share is proportional to the attractiveness of the facilities. Data on expenditure per capita translate these figures into dollar sales and the estimates of sales per square metre finally yield estimated equilibrium sizes of the commercial facilities.

Figure 4 may make this process a little clearer. The input data (population, income, travel times, employment, expenditures and sales per square metre) represent an estimate about the future. One such set of input data is called a 'scenario'. (The model is run for several scenarios, so that we can get some idea of how development depends upon what we expect the future to be like.) So data for one such scenario is assembled and input into the model. We must also estimate the starting size of commercial facilities; since this estimate does not affect the outcome, we may assume that all facilities start equal to their current size. The model then tells us what sales will be made by each commercial facility (these sales come from home-based shopping trips to one or more centres or from work-based shopping trips). Some centres would be making a lot of sales in relation to their size, others less: the first ones are highly profitable, while the others are less profitable or even unprofitable. So the model causes profitable facilities to grow and less profitable ones to decline. But this causes the sales of the growing centres to increase and of the declining centres to fall. So sales per square metre again vary. Therefore, some centres grow, others decline. Then we go through again, and again, until all facilities make the same sales per square metre. This is "equilibrium", when each facility in the study region can make the same profit (if equally efficient).

In all cases, these calculations are performed for two types of retail facility – supermarket and grocery (food type) facilities, on the one hand, and other (DSTM) facilities on the other hand. Although the model can be used to estimate the equilibrium

Figure 4

SYSTEMS INPUT – OUTPUT


INPUT - WHERE DO PEOPLE WORK?
INPUT - WHERE DO PEOPLE LIVE
INPUT - TRAVEL TIME MATRIX
INPUT - FIRST GUESS AT ATTRACTION OF FACILITIES
COMPUTE WHAT SALES ARE MADE ON HOME BASED SHOPPING TRIPS?
COMPUTE TOTAL SALES ON ALL TRIPS
REVISE FACILITY SIZE
NO
ARE TOTAL SALES PROPORTIONAL TO SIZE?
YES
COMPUTE SIZE (M²) OF FACILITIES
END

space allocation for other kinds of facilities as well, the data do not exist to predict the new facilities needed and so the requirements for food/beverage, automotive and personal service establishments must be estimated separately, as described in the last section of the chapter.

DATA SOURCES AND SCENARIOS

To 1989, the model is run for nine scenarios; for 2001 there are thirty-six scenarios (though not all are reported here). This section of the chapter describes the ways in which these scenarios have been built up.

POPULATION FORECASTS

Six different population forecasts are used in this study. They are listed in Table 1. The basis for these forecasts are:

(i) Very high: from the Regional Official Plan (see Hamilton-Wentworth Planning and Development Department background report, Population Future Growth - Regional Official Plan Study, 1976). It also corresponds to a projection made on the basis of a rapidly increasing birth rate. This population is most unlikely to occur, but is included because of its status in the Regional Official Plan.

(ii) High: Regional population total from Hamilton-Wentworth Planning and Development Department, Hamilton-Wentworth Population Projections 1981 Review (September 1981), and the population increase is allocated to those zones having developable land.

(iii) *Medium High: a forecast especially generated for this study on the assumption that present demographic characteristics remain constant, but immigration increases.*

(iv) *Most Likely: from Hamilton-Wentworth Planning and Development Department (September 1981) and Hamilton-Wentworth Planning and Development Department, Allocation of 1981 Population and Employment Projections (2001) to Traffic Zones (June 1982). It should be noted that this forecast explicitly follows the staging guidelines of the Regional Official Plan. (The name "Most Likely" is taken from the Hamilton-Wentworth Planning and Development Department reports of September 1981 and June 1982.)*

(v) *Low: in the same way as (ii). Among the zones, it is assumed that the mountain, and especially the south mountain grows more slowly than in (ii).*

(vi) *Very low: a forecast especially generated for this study by assuming that all present demographic characteristics remain constant (and, in particular, there is no decline in the death rate).*

The scenarios for 2001 use all six of these population projections. However, only three of the projections are used for 1989 - those corresponding to High, Most Likely and Low - because the others are insufficiently different to require separate calculation. The 1989 population projections are shown in Table 2: they are proportional to the 2001 projections except that the south mountain is projected to develop later in the study period rather than earlier.

TABLE 1

POPULATION ESTIMATES, 2001

Zone	1982 Actual Population	Very High	High	Medium High	Most likely	Low	Very Low
19	5837	7000	4900	4900	4900	4900	4900
20	7530	3000	2200	2200	2200	2200	2200
23	35270	35800	31850	32550	31250	31050	31850
22	40575	47000	34600	34400	34000	33800	38800
21	43286	51500	38000	37700	37200	37000	40000
18	26659	33000	28900	28700	28400	27400	27400
17	16943	19500	14500	14500	14500	14500	16100
16	19949	20000	18750	18750	18750	18750	18750
25	28605	29000	25800	25500	25000	25000	25000
26	42487	51500	45500	45000	44000	43000	43000
27	22416	26500	24100	24000	23400	23000	23000
30	5833	5500	7000	6800	6000	6000	6000
29	3020	27200	23000	22000	19800	15800	4000
28	9992	10500	14400	14000	12600	11600	10000
Total Hamilton	308147	367000	313500	310000	302000	294000	291,000
45	37481	64000	58000	56000	53000	48500	43500
67	19699	25500	23000	22500	20000	18000	18000
89	14733	46500	40500	37500	32000	27000	24000
Other Municipalities	34160	47000	44000	41000	38500	35000	35000
Total Region	414175	550000	479000	467000	445500	423000	411500

HWPDD, 1982 Hamilton-Wentworth Population Statistics (June, 1983) provided 1982 data.

TABLE 2

POPULATION ESTIMATES, 1989

Zone	1982 Population	High Projection	Most likely Projection	Low Projection
19	5837	5500	5500	5500
20	7530	6500	6500	6500
23	35270	34000	33800	33800
22	40575	38375	38150	38075
21	43286	41350	41000	41000
18	26659	28900	28400	27400
17	16943	16000	16000	16000
16	19949	19500	19500	19500
25	28605	27600	27300	27300
26	42487	45500	44000	43000
27	22417	24100	23400	23000
30	5833	6000	6000	6000
29	3020	6625	4600	3975
28	9992	10750	10250	10100
Total Hamilton	308147	310700	304400	301050
45	37481	47300	27100	45750
67	19699	21300	19900	19000
89	14733	27000	25400	23900
Other Municipalities	34160	38700	36700	34800
Total Region	414175	445000	433500	424500

HWPDD, 1982 Hamilton-Wentworth Population Statistics (June, 1983) provided 1982 data.

INCOME LEVELS

The total expenditures that originate in each zone depend on that zone's population and upon its average per capita income. Data drawn from the 1981 Census Population, (see Table 3), provide information on the relative income levels of the zones in the City. Although actual average incomes will undoubtedly change over the study period, it is assumed that the relative income level of each zone will remain constant: that is, if in 1981 a zone's per capita income was 1.2 times the Region's average, it is assumed that the zone's per capita income will also be 1.2 times the Region's average in 1989 and 2001. The data on relative income levels are given in Table 3.

In 1980 the south mountain per capita incomes were below the City average. We may anticipate that extensive migration into the zones 28-30 will raise their average per capita income. Hence, the use of Table 3 as a basis for the scenarios may be slightly conservative.

TRAVEL TIMES

Next, estimates must be made of the travel times between zones. Measurements have been made of present day travel times and these must be projected into the future. Two sets of travel times are available.

(i) Present travel times are drawn from computations of the Hamilton-Wentworth Planning and Development Department for the existing road network and existing uses.

(ii) The Department also provided travel times for a forecast network, which

TABLE 3

RELATIVE PER CAPITA INCOME LEVELS

	AVERAGE PER CAPITA INCOME 1980	INCOME AS PROPORTION OF AREA AVERAGE
19	5868	0.68
20	6585	0.77
23	8095	0.94
22	7713	0.90
21	7121	0.83
18	10196	1.19
17	9094	1.06
16	10557	1.23
25	9465	1.10
26	8603	1.00
27	9202	1.07
30	7879	0.92
29	8258	0.96
28	7199	0.84
45	8857	1.03
67	10243	1.20
89	9246	1.08
AVERAGE FOR ALL ZONES	8571	1.00

Source: see Appendix, Section 2

includes the East-West and North-South transportation facilities, presuming that the Most Likely forecast population uses the network. Tables 4A and 4B provide these times, aggregated up from the Hamilton-Wentworth Planning and Development Department data to the zones used in this study.

The 1989 scenarios all use the travel times for the existing network.

Both sets of travel times (present and anticipated) are used for the 2001 scenarios. In one set of scenarios, travel times are assumed to reflect the forecast network: this is the "best case" (best in the sense of ease of travel), for the East-West facility is not projected to be completed until after 2001. In the other set of scenarios, travel times are assumed to reflect the present network and present traffic loads. Since almost all scenarios project a increase in population, the use of these travel times reflects the assumption that incremental road improvements can keep pace with load increase. Even so, travel times are longer than for the projected network.

EMPLOYMENT

The next major set of input data concern the distribution of employment for 1989 and 2001. The model recognizes that much shopping is done on trips to and from home and for this purpose the population distribution is needed. In addition, though, a substantial share of commercial activity is performed on multi-purpose and multi-stop trips, some of which involve stopping on trips to or from work; for this, the distribution of employment is needed.

Estimates of the zonal distribution of employment for 2001 corresponding to the Most Likely population forecast are contained in Hamilton- Wentworth Planning and

TABLE 4A

INTERZONAL TRAVEL TIMES, PROJECTED NETWORK

	Destination																
Origin	19	20	23	22	21	18	17	16	25	26	27	30	29	28	45	67	89
19	45	116	233	183	121	76	92	117	188	146	136	206	170	163	257	168	194
20	112	63	134	109	104	130	170	200	170	163	189	180	186	209	171	250	260
23	213	129	74	102	157	215	245	277	138	156	189	122	147	187	120	315	271
22	180	106	102	63	103	169	204	247	118	135	183	123	148	183	145	311	272
21	116	110	164	109	58	94	129	172	136	121	146	164	159	177	212	234	248
18	69	125	218	172	97	49	85	114	162	119	114	187	151	150	263	169	191
17	95	178	251	215	146	89	41	80	175	130	90	180	143	124	304	136	154
16	123	209	282	248	176	122	79	33	218	174	136	215	177	156	334	98	158
25	196	161	142	118	146	160	174	218	24	118	106	60	75	110	394	273	199
26	153	174	157	143	140	114	131	176	59	32	74	69	52	81	209	228	110
27	139	193	171	183	149	118	96	136	112	74	25	120	64	51	241	188	129
30	208	176	122	123	172	181	183	211	60	69	101	12	49	91	175	254	181
29	173	180	147	148	162	147	145	173	75	52	64	49	14	48	204	228	141
28	177	208	182	183	178	153	120	152	110	81	55	91	48	19	235	207	119
45	254	170	116	150	206	261	328	329	187	208	241	175	200	235	89	371	324
67	172	257	323	298	230	176	135	98	259	230	192	269	231	210	367	66	182
89	196	264	261	271	250	195	150	156	199	161	129	181	141	119	324	176	90

Data are in tenths of a minute (i.e. 112 = 11.2 minutes).

Source: Hamilton-Wentworth Planning and Development Department

TABLE 4B

INTERZONAL TRAVEL TIME, EXISTING NETWORK

	Destination																
Origin	19	20	23	22	21	18	17	16	25	26	27	30	29	28	45	67	89
19	45	116	216	184	121	76	92	117	188	146	136	206	170	163	257	162	194
20	112	63	135	110	104	130	170	200	170	164	189	180	180	109	197	251	264
23	214	130	79	107	164	219	257	277	142	156	189	119	147	182	117	316	245
22	181	106	107	63	103	169	206	247	118	147	183	133	148	183	150	290	272
21	116	110	166	109	58	94	129	171	136	122	146	164	159	177	212	226	244
18	69	125	217	172	100	49	81	114	182	113	114	187	151	150	263	169	197
17	95	178	155	218	146	89	41	72	165	100	90	180	143	124	304	136	154
16	123	209	284	248	176	122	68	33	218	174	126	215	177	156	334	98	158
25	204	168	142	121	146	161	181	218	24	59	112	60	75	110	193	273	199
26	155	175	156	157	130	118	112	176	59	33	74	69	52	81	192	231	170
27	140	208	171	183	149	118	96	136	112	74	25	101	64	51	241	192	129
30	209	176	122	123	172	181	183	211	60	69	101	12	49	91	175	266	181
29	182	181	147	145	162	146	157	173	75	52	64	49	15	48	200	219	141
28	169	212	198	195	177	148	126	152	110	81	51	91	48	19	234	207	119
45	254	190	120	161	215	266	303	329	187	209	241	175	200	228	87	385	324
67	172	257	328	301	226	176	135	98	272	230	186	269	221	210	372	65	182
89	196	273	253	278	249	195	150	158	199	169	129	181	141	119	323	181	90

Data are in tenths of a minute.

Source: Hamilton Wentworth Planning and Development Department

TABLE 5
EMPLOYMENT ESTIMATES

Zone	1982	1989 ESTIMATE			2001 ESTIMATE		
		High	Most Likely	Low	High	Most Likely	Low
19	2,307	2,275	2,275	2,275	2,225	2,300	2,225
20	45,374	46,350	45,850	43,400	48,000	45,000	40,000
23	11,184	10,750	10,150	10,250	10,000	11,000	8,663
22	8,854	10,000	9,450	9,450	12,000	9,457	10,440
21	16,901	18,050	17,850	17,850	20,000	19,471	19,471
18	30,150	37,850	37,450	35,600	51,000	46,218	44,900
17	5,814	6,600	6,500	6,500	8,000	7,179	7,179
16	11,470	10,550	9,950	9,950	9,000	11,000	11,000
25	1,841	1,750	1,750	1,750	1,907	1,907	1,907
26	9,926	11,800	10,750	10,300	15,000	12,197	11,000
27	5,511	6,050	6,050	6,050	7,027	7,027	7,027
30	528	700	700	700	958	958	958
29	363	1,150	800	800	2,182	1,182	1,182
29	1,243	2,850	2,600	2,200	5,591	4,894	3,800
Total Hamilton	151,466	166,725	162,125	157,075	192,800	179,800	166,050
45	12,119	17,450	16,600	16,250	26,600	24,322	23,370
67	4,444	5,150	4,850	4,750	6,400	5,538	5,230
89	2,607	6,050	5,100	4,700	12,000	9,415	8,340
Other Municipalities	6,006	7,550	7,100	6,900	10,200	8,925	8,510
Total Region	176,642	202,925	195,775	189,675	248,000	228,000	211,500

1982 employment survey data and 2001 Most Likely estimate are from Hamilton-Wentworth Planning and Development Department.

Development Department, Allocation of the 1981 Population and Employment Projections (2001) to Traffic Zones (June 1982). It should be noted that these forecasts are strictly of the labour force by zone rather than of the employment level per zone. (To the model, the relative share of each zone in the area's employment is more important than the absolute level of that employment.) However, the remaining 2001 forecasts and the three 1989 forecasts have been constructed specially for this study. The "Low" 2001 estimate assumes that the cause of slow population growth is slow employment growth, so the existing employee/population ratio falls, leading especially to employment declines in zones 18 and 20. The Very Low forecast has the same relative distribution of the region's employment. In the three higher estimates (Medium High, High and Very High), the City gains jobs which are allocated to the major employment centres (zones 16, 20, 22, 23, 26), and to the major suburban zones (28 and 29). Zones 6 and 20 are not expected to grow too fast because of congestion and shortage of developable land.

Finally, the 1989 employment estimates are simply proportional to the difference between 2001 and 1982.

Table 5 contains the projections.

EXPENDITURE AND SALES

Data on consumer expenditures and sales per square metre of commercial space are required as well. What is important for the model and its projections is how these two variables change in relation to each other. There are three general possibilities: 1. consumer expenditure per capita rises faster than sales per square metre; 2. it rises at the same rate; 3. consumer expenditure rises more slowly than sales per square metre.

In Ontario in the 1970's, food expenditure per capita rose slightly (in constant

dollars) and DSTM purchases fell slowly. (See Appendix, Tables 1 and 2.) However, neither of these trends is significant: the data do not indicate any tendency toward a rise or fall in real dollars. Hence we assume that this constancy will continue: food type expenditure is expected to equal $361 and DSTM expenditures are expected to equal $648 over the study period. (Data are in constant 1971 dollars).

The median sales per square foot for all DSTM stores in Canadian regional shopping centres were $51.50 (1971 dollars) in 1978. Similarly, food type stores sold $105.81 per square foot in 1981. (See Appendix Tables 3 and 4.) Three assumptions are made about the rate of growth of these values (in relation to expenditures), namely:

1. high assumption: grows at 0.25% per annum faster than expenditures
2. medium assumption: grows at the same rate as expenditures
3. low assumption: grows at only 99.75% of the rate of growth of expenditures.

Three aspects of these projections should be noted. First, sales per square metre (p.s.m.) tend to be higher in regional shopping centres than in other commercial facilities, so the estimates used here are conservative. Secondly, Hamiltonians' expenditures per capita have been assumed to be the same as those of Ontario as a whole. This reflects the twin facts that, on the one hand, Hamilton's personal disposable income has exceeded the Ontario average by about 5% during the 1970's; on the other hand, this advantage has been declining since about 1975. Thus, a conservative assumption is being made. Thirdly, it is presumed that there is no greater leakage of Regional residents' expenditure outside the Region than inflow of non-residents' expenditures to the Region. It should be emphasized that these growth or decline rates are not absolute but in relation to expenditures per capita.

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THE SCENARIOS

Thus, the computer model is run for a variety of scenarios. For 1989, there are three possible population and employment cases - high, most likely and low. Current relative income levels in the model study area are assumed to continue. Only a single set of travel time forecasts is used, representing best estimates of the 1989 road network and travel habits in the area. Three sets of expenditures on food type and DSTM facilities relative to sales per square metre are envisaged - high, medium and low growth of expenditures relative to growth of sales per square metre. In this way, 9 scenarios are built up, as shown in Table 6.

For 2001 there are 36 scenarios. There are six possible population and employment forecasts. Current relative income levels in the model study area are presumed to persist. Two sets of travel times are used, corresponding to the existing and the proposed networks. Three sets of expenditures relative to sales per square metre are envisaged. The 36 scenarios are shown in Table 7: For example, the scenario 2A assumes high spending growth, high population and the forecast travel network, while scenario 17B assumes low spending growth, low population and the existing travel network.

The model uses two additional internal sets of data. Firstly, average travel times from home to both food type and DSTM facilities must be estimated. These are projected from current times and facility locations. Secondly, the model uses a fixed set of multi-purpose, multi-stop linkage data. From these data, the model computes sales made at each centre on trips that start elsewhere or have a different initial purpose than shopping. The model relies upon data collected in 1978 but it has been updated with data collected by the Hamilton-Wentworth Planning and Development Department in 1983 (Secondary Plan Commercial Design Standards Study).

TABLE 6

1989 SCENARIOS

Growth of spending relative to growth of sales per square metre	Population/Employment Forecast		
	High	Most likely	Low
High	1	2	3
Medium	4	5	6
Low	7	8	9

TABLE 7

2001 SCENAHIOS

Growth of spending relative to growth of sales per square metre	Population/Employment Forecast					
	Very High	High	Medium High	Most Likely	Low	Very Low
High	1A. 1B	2A. 2B	3A. 3B	4A. 4B	5A. 5B	6A. 6B
Medium	7A. 7B	8A. 8B	9A. 9B	10A. 10B	11A. 11B	12A. 12B
Low	13A. 13B	14A. 14B	15A. 15B	16A. 16B	17A. 17B	18A. 18B

OTHER FACILITIES

The scenarios described in this chapter have focused so far on methods of estimating the demand for food and DSTM facilities in the UJSM study area. The report also estimates the demand for other types of commercial space - food and beverage establishments which cater to local demand (as opposed to long distance travellers or people on holiday), the automotive sector, and personal service establishments. Since data are not available to estimate new space needs for such facilities, some means outside the model were used to estimate the demand for these establishments in the USJM.

Personal service demands are computed by surveying such establisments in shopping centres that correspond in size to the space requiremonts projected by the model.

Requirements for food/beverage and automotive establishments are computed from Statistics Canada data (see Appendix, Section 7). Essentially, spending per capita is estimated and related to sales per establishment.

CHAPTER 4

MARKET DEMAND ANALYSIS: RESULTS

This chapter presents the results of the computer analysis, using the projections described in the previous chapter. The first part of the chapter reports briefly on the estimates of the demand for retail space in the scenarios and discusses the choice of scenarios. The second part of the chapter considers one pair of scenarios in detail (10A and 10B of Table 7 of Chapter 3), those which are based on the Most Likely population and employment forecasts and in which sales per square metre rise at the same rate as income. This is seen to provide the most acceptable scenario to use for planning. The presentation includes estimates of demand for retail space in the UJSM area, estimates of the effect of development on other areas, an analysis of trade areas and some analysis of the composition of commercial development in the UJSM area.

The 1989 scenarios all lead to similar predictions about development, so they are reported briefly in the second section of the chapter rather than being discussed separately.

ANALYSIS OF SCENARIOS

The previous chapter (Table 7) has proposed 36 possible scenarios, eighteen combinations of population and expenditures and two travel networks. Table 3 of this chapter will show that the choice of a travel network assumption has little effect upon the results (and other solutions of the model confirm this), so results are reported here only for the "A" scenarios, in which the travel times are based upon the new East-West transportation facility and Most Likely 2001 population projections. (It will be seen later

just how little an effect this assumption has). There are 18 such scenarios. Table 1 presents the commercial space demands for 2001 for these 18 scenarios. In each case, the commercial space needs on the mountain are stated (food and DSTM) and the possible size of the UJSM development is computed.

There exists a check upon the accuracy of the computations that lead to Table 1. In the Secondary Plan Commercial Design Standards (Hamilton-Wentworth Planning and Development Department, August 1983, p. 15), it is estimated that the present population of the mountain needs 212,700 m^2 of food and DSTM space. In Table 1, the scenario which has the same mountain population as now and the same expenditures is 12A (very low population and medium growth of $psm): the projected food and DSTM space needs for the mountain zones (25-30) are 217,500 m^2 in this scenario. The difference between the two calculations is about 2%, which is very satisfactory since the two results were arrived at independently.

The body of Table 1 reports the equilibrium size of the commercial (food and DSTM) facilities in each zone under each scenario. The second line from the bottom reports the equilibrium space needs on the mountain. Since the UJSM is on the border of zones 28 and 29, the model was run by allowing commercial development to occur only in the one zone (29), thus concentrating UJSM development in the one area. (This economizes on computer time.) In reading this table, note that the mountain now has 238,000 m^2 of commercial space (of which 9000 m^2 are vacant). Hence, in interpreting the results of scenario 2A, for example, observe that the mountain could support 245700 m^2 of space in 2001, merely 7,700 m^2 more than is there now. This indicates that the UJSM development cannot exceed 7,700 m^2 without potential damage to existing facilities. In scenario 14A, the mountain could support 276,200 m^2, that is 38,200 m^2 more than is there now. In this case, UJSM could achieve its equilibrium size of 32,400 m^2 and still leave some room for other facilities to grow. The projected sizes for UJSM arrived at in this scenario are

shown in the last line of Table 1.

Food/beverage needs are projected by assuming that the additional people in zone 29 each spend $60 locally per annum (1971 dollars) and the average establishment needs $59,000 in annual sales (1971 dollars). Automotive needs are projected by assuming that the additional people in zone 29 each spend $107.10 locally per annum (1971 dollars) and such facilities require annual sales of $363,000 for profit. (The Appendix, Section 7, justifies these numbers.) That is, it is supposed that the needs of the existing people are already met by existing facilities and so there is no need to build additional facilities in UJSM to accommodate them: new facilities are built for additional people.

Personal service needs are computed as follows. A survey of space uses in some shopping centres in the model study area reveals that such personal services as banks, hairdressers, pharmacies, dry cleaners and repairers take up about 10% of the total space in smaller centres (less than 10,000 m^2), but somewhat less in the larger centres. So in Table 2 an additional 10% of Food/DSTM space has been allocated for personal services in centres of less than 10,000 m^2, gradually decreasing to 7% in the larger centres.

The results for food and DSTM expenditures can be combined with other needs to provide an estimate of the total space needs in UJSM in each scenario. These estimates are provided in Table 2. Since these estimates differ so much, we must now examine their basis to attempt to discriminate between them. Consider first the population estimates.

(1) The Very High population estimate corresponds to the projections used in the Official Plan of the Region. The projection was first made in 1976, but by 1980 the Region's population was already 23000 less than that projected by the Plan (Hamilton Wentworth Planning and Development Department, September 1981, p.5). An alternative way of arriving at this projection is to suppose that the average lifetime number of children

TABLE 1

COMMERCIAL SPACE DEMANDS, 2001 ($000m^2$)

ne	Current	VERY HIGH POPULATION			HIGH POPULATION			MEDIUM HIGH POPULATION			MOST LIKELY POPULATION			LOW POPULATION			VERY LOW POPULATION		
		Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
		$pam 13A	$pam 7A	$pam 1A	$pam 14A	$pam 8A	$pam 2A	$pam 15A	$pam 9A	$pam 3A	$pam 16A	$pam 10A	$pam 4A	$pam 17A	$pam 11A	$pam 5A	$pam 18A	$pam 12A	$pam 6A
)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
)		65.2	61.5	58.0	59.7	56.3	53.1	52.5	56.1	52.8	57.0	53.8	50.8	55.2	52.0	49.2	51.9	48.9	46.2
2		71.8	67.7	63.9	55.5	52.3	49.4	55.6	51.7	48.1	54.1	51.0	48.1	53.4	50.3	47.4	51.8	54.8	31.7
1		47.7	44.9	42.4	35.3	33.3	31.5	34.5	32.5	30.7	34.4	32.5	30.7	34.1	32.1	30.3	38.3	36.1	34.1
3		101.6	95.7	90.3	79.1	74.6	70.4	78.8	73.9	69.9	77.4	72.9	68.9	75.1	70.7	66.8	82.5	77.8	73.4
7		27.7	26.1	24.7	22.3	21.1	19.8	21.7	20.2	19.3	21.7	20.5	19.3	21.2	19.0	18.9	22.2	20.9	19.7
5		42.2	39.8	37.5	42.9	40.5	38.2	42.3	39.4	37.8	40.8	38.4	36.3	39.5	37.2	33.9	34.2	32.2	30.4
5	31	61.3	57.8	54.6	53.7	50.7	47.8	52.8	50.9	47.2	51.3	48.4	45.7	50.6	47.7	45.0	47.1	44.4	42.0
5	166	164.3	154.8	146.0	132.6	124.9	117.9	127.8	121.6	116.5	123.8	116.7	110.0	118.9	111.1	104.7	119.2	112.4	106.0
7	31	63.7	60.0	56.7	57.5	54.3	51.2	56.7	54.8	53.2	53.2	50.2	47.4	50.4	47.5	44.9	47.7	45.0	42.5
)	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	3	31.9	30.1	28.4	32.4	30.6	28.8	31.2	29.7	28.5	27.9	26.3	24.8	24.4	23.0	21.8	16.6	15.7	14.8
8	6	Commercial development suppressed																	
5		45.3	42.8	40.4	47.8	45.1	42.6	47.1	45.2	43.6	43.8	41.4	39.1	40.3	38.0	35.9	31.7	29.9	28.3
7		36.9	34.8	32.9	36.3	34.2	32.3	35.5	33.6	32.4	32.0	30.2	28.4	29.3	27.7	26.2	26.5	25.0	23.6
9		33.3	31.4	29.7	30.2	28.5	26.9	28.9	26.8	26.1	23.9	22.6	21.3	20.4	19.3	18.2	18.3	17.2	16.3
PACE NEEDS N MOUNTAIN		321.2	302.7	285.7	276.2	260.5	245.7	268.5	257.0	245.4	256.2	241.6	227.9	244.3	229.3	216.4	230.6	217.5	205.3
OSSIBLE SIZE F UJSM (Zone 29)		31.9	30.1	28.4	32.4	22.5	7.7	30.5	19.0	7.4	18.2	3.6	0.0	6.3	0	0	0	0	0

- means insignificant

Currently the mountain has 238 ($000m^2$) Of which slightly over 9 ($000m^2$) are vacant

per woman rises from its current level of 1.7 to its 1940's level of 3.0. This projection really ought to be regarded as too high.

(2) The High population estimate was derived by Hamilton-Wentworth Planning and Development Department (September 1981), assuming both a gradual increase in fertility and a high rate of immigration to the Region. The recent past and discussions of the Region's economic health (see, for example, the McMaster-Spectator conference of October, 1983) both indicate that this projection is unlikely to be realized.

(3) The Medium High population estimate is based on an economic model in which such demographic characteristics as average children per female are constant, others follow recent trends (declining mortality, increasing labour force participation rate), while net immigration to Canada rises. This population increase stimulates home building and investment that in turn stimulates the Region's basic industries. This is perhaps the highest realistic projection, although it is still somewhat optimistic. It should be combined with a conservative assumption about sales per square metre. Thus scenario 3A may be interpreted "possible".

(4) The Most Likely population projection is drawn from the Hamilton-Wentworth Planning and Development Department (September, 1981) under the assumption that fertility rates will continue to decline and there is a small net migration into the Region. This projection lies between the limits of believable projections. At current expenditures per square metre, this projection gives rise to scenario 10A, reported in detail later in the chapter.

(5) The Low population projection comes from two sources. Hamilton-Wentworth Planning and Development Department (September 1981) makes this projection by assuming that fertility rates will continue to decline and the present net emigration from

TABLE 2

TOTAL COMMERCIAL SPACE REQUIREMENTS, UJSM, 2001

CENARIO	PROJECTION POPULATION	$psm	FOOD DSTM ^{2} (000m^2)	FOOD/BEV (No.)	AUTOMOTIVE (No.)	PERSONAL SERVICES ^{2} (000m^2)
3A	V. High	Low	31.9	24	7	2.2
A	V. High	Medium	30.1	24	7	2.1
A	V. High	High	28.4	24	7	2.0
4A	High	Low	32.4	20	6	2.3
A	High	Medium	22.5	20	6	1.6
A	High	High	7.7	20	6	0.8
5A	Med. High	Low	30.5	19	6	2.1
A	Med. High	Medium	19.0	19	6	1.5
A	Med. High	High	7.4	19	6	0.7
6A	M. Likely	Low	18.2	17	5	1.5
0A	M. Likely	Medium	3.6	17	5	0.4
A	M. Likely	High	0.0	17	5	0.0
7A	Low	Low	6.3	13	4	0.6
1A	Low	Medium	0.0	13	4	0.0
A	Low	High	0.0	13	4	0.0
8A	V. Low	Low	0.0	1	0	0.0
2A	V. Low	Medium	0.0	1	0	0.0
A	V. Low	High	0.0	1	0	0.0

V = Very Med = Medium Bev = Beverage No. = Number

undas, with 19,000 people (about the same as zone 29 has in cenarios 4A, 10A, 16A) has 20 food/beverage establishments nd 7 gas stations.

the Region continues. This projection also arises if the Region's growth is driven largely by population change in Canada (and the consequent demand for the output of basic industries) and if Canada's demographic rates follow present trends. (These projections are described in detail in the Appendix.) This projection is not unlikely, but it is only if sales per square metre grow slowly compared to personal expenditures (scenario 17A) that this projection is consistent with development of commercial facilities in UJSM.

(6) The Very Low population projection is based on the model that Canada's demographic rates all follow current trends, except that mortality rates are constant, and that the Region's industrial growth therefore stagnates. Although not impossible, this may be pessimistic.

On the grounds of reasonableness and of falling between two possible extremes (3 and 5), we suggest that scenario 10A be adopted as the basis for elaborating possible development of the UJSM area, but that the possibility of the low populations projection should not be ignored. The recommendations spell out the implications of this suggestion more completely, but first this scenario is examined in more detail. (Such computations have been made for all the scenarios, but the space needed to report them precludes the detailed description of more than one.)

SCENARIOS 10A, 10B (2001)

In these scenarios the population of the Regional Municipality is expected to reach 445,000, of which 407,000 will reside in the model study area. At current expenditure levels that implies retail sales of $146.927 million in food type stores and $263.736 million in DSTM. At present levels of sales per square metre, this could support 129,008 m^2 of food type stores and 475,800 m^2 of DSTM stores in the study region. The computer model allocates this space to zones in such a way that each retail facility makes the same sales per

square metre. Table 3 contains these predicted demands for commercial space for the two scenarios.

DEMAND

Scenarios 10A and 10B differ in the assumptions they make about travel conditions. In 10A, the projected network is used as a basis for travel times; in 10B, the existing network is used. The assumption about which network will be in place clearly has some minor effects - maintaining the existing network and flow conditions would tend to centralize development downtown (zone 18) and on the north mountain (zones 26 and 27). Table 3 shows that if commercial space were to be located so as to keep all centres equally profitable, some shifting of existing facilities would be needed: in particular, the results show that the existing development in zone 26 (central mountain-Limeridge Mall) could profitably have been slightly more dispersed than it actually is. And, similarly, as the south mountains' population grows, the UJSM area could support development of about 25000 m^2.

But such shifting of facilities is not realistic. We cannot redevelop zone 26 nor permit development in UJSM to make existing facilities unprofitable. Hence, a far better method of evaluating the commercial potential of the UJSM area is as follows: (Refer to Table 2). In 1980, the inventory of commercial space on the mountain was 238,000 m^2, of which 9000 m^2 were vacant (see Table 1). The projected needs are: 241,500 m^2 (scenario 10A) and 242,000 m^2 (scenario 10B). Hence by the year 2001 the mountain as a whole could support approximately 3,500 m^2 more food and DSTM space than is there now. Table 1 suggests that this space could profitably be allocated to the UJSM area. This then is the first step in projecting commercial development: the UJSM area could support 3500 m^2 of food and DSTM space by the year 2001. At present, about 3% of such space on the Mountain is vacant, so an extra 100m^2 should be added to this figure to allow for vacancies.

TABLE 3

COMMERCIAL SPACE DEMANDS, 2001, FOR SCENARIOS 10A, 10B (000 m^2)

Zone	Present Space*	Scenario 10A		Scenario 10B	
		Food	DSTM	Food	DSTM
19		-	-	-	-
20		-	-	-	-
23		9.2	44.6	8.6	43.3
22		9.9	41.0	9.9	40.8
21		7.6	24.9	7.5	27.2
18		13.3	59.6	13.4	62.5
17		4.5	15.9	4.5	17.3
16		6.7	31.7	6.5	29.2
25	30(1)	12.3	36.1	12.3	35.4
26	162(4)	14.8	101.9	15.6	106.4
27	27(4)	12.6	37.6	13.5	37.9
30	1(0)	-	-	-	-
29	3(0)	6.1	20.1	5.9	18.0
28	6(0)	-	-	-	-
45		14.1	27.3	14.0	24.2
67		8.8	21.4	8.4	19.7
89		9.0	13.6	8.9	14.1

Notes: * present inventory of commercial space, based on Hamilton-Wentworth Planning and Development Department survey of 1980.
( ) = vacant space.
- means insignificant (less than 1000 m^2)
UJSM is zone 28
"Mountain" is zones 25-30

In the terms of the Secondary Plan Commercial Design Standards, this recommendation corresponds to the suggestion that a shopping centre be built as either a small neighbourhood centre or a large convenience centre. This seems eminently reasonable. Neighbourhood centres are generally reckoned to need a minimum population of 15,000 (Secondary Plan... p. 8), but zone 29's population increase is anticipated to be 16,000 people (see Table 1 of Chapter 3). At the same time, the existing overprovision of retail space on the mountain (Secondary Plan..., pp. 14-15) holds the UJSM centre to a smaller size than the average neighbourhood centre.

Since the two scenarios differ by so little, only 10A (future network) is considered from now on.

TIMING

Table 4 describes the analysis of timing. A run of the model for the 1989 scenario 10A reveals that by then the profitable space needs on the mountain will be 227500 m^2, slightly less than the existing provision of space (238,000 m^2) and close to the presently used space (230,000 m^2). Hence, no new development is needed in the next five years. Estimating 1995 demands from the 1989 and 2001 results suggests further that no food and DSTM development is really required until the turn of the century. However, some food/beverage and automotive facilities could be developed by 1995.

TRADE AREAS

Suppose, then, that by the year 2001, the following developments take place:

(a) Commercial facilities on the mountain remain the same as in the 1980

inventory, except that 3,500 m^2 retail space is built (and is not vacant) in the UJSM area, of which 1,200 m^2 is food type space and 2,300 m^2 is DSTM space; and

(b) commercial facilities elsewhere in the model study area are at their equilibrium size as given in Table 1, scenario 10A.

Now the trade areas of each zone's commercial facilities can be calculated. Figure 5 gives the results in schematic form for the DSTM facilities on the mountain, and Figure 5 for the food facilities.

These results show clearly the domination of zone 26 (which includes Limeridge Mall) over the other mountain commercial facilities for DSTM purchases. This zone, which lies between Upper James and Upper Gage Street, attracts over 50% of all purchases made by residents on the Mountain. The zones 25 and 27 each attract between 5% and 10% of the purchases made by mountain residents. By contrast, the UJSM development can attract no more than 5% of the purchases of mountain residents.

DSTM expenditures show considerable overlap of trade areas: people tend to travel relatively long distances for these comparison shopping items. By contrast, the food type trade areas are spatially more circumscribed (see Figure 6). Each zone's commercial facilities dominate the food purchases of that zone's residents. Only the two zones 28 and 30, which lack significant commercial facilities, spend much of their food dollar outside the zone, and then only in neighbouring zones.

THE NO-DEVELOPMENT OPTION

But suppose that no development is allowed to take place in the UJSM area. What

TABLE 4

COMMERCIAL SPACE DEMANDS, 1984-2001

HAMILTON MOUNTAIN

	FOOD/DSTM (000 m^2) SPACE		
1984[a]	230.00	(238.0 available)	
1989[b]	227.5	1 food/beverage	0 automotive
1995[c]	234.5	8 food/beverage	2 automotive
2001[d]	241.5	17 food/beverage	5 automotive

Sources:
(a) 1980 inventory
(b) 1989 scenario 10A, computer model
(c) interpolation between (b) and (d)
(d) Table 3

Note that 1989 scenarios 8A and 11A give virtually identical results to these.

effect will that have on the commercial facilities on the mountain?

The simplest way to state this effect is to say that each year some $2.35 million (1971 dollars) more will be spent in other shopping centres than would be if 3,500 m^2 were built in UJSM. (The model study region population will spend close to $400 million that year). The food type portion of this will come largely from zone 29 residents and so will be directed to the nearest alternative (zones 25, 26 and 27). There is likely to be some pressure upon (congestion in) these nearby centres and neighbourhood food type stores. By contrast, DSTM spending will largely go to zone 26 (and to non-mountain zones).

IMPACT ASSESSMENT

The effects of allowing more or less development than is recommended in scenario 10A can be summarized as follows:

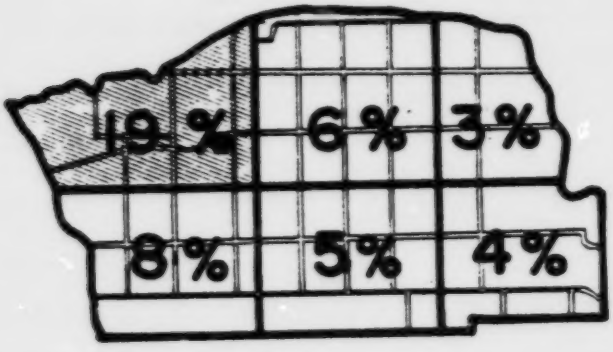
1) *If there is no development permitted, the existing centres on the mountain will receive more business than they do now.*

2) *If 3500m^2 of Food and DSTM space is built in the UJSM area, it will not detract from the existing sales in the existing centres - since the UJSM development will be meeting the demands of the new residents on the mountain. Indeed, the recommendation of this study is based on the concept of permitting the UJSM area to develop only to the extent that existing facilities are not negatively impacted upon.*

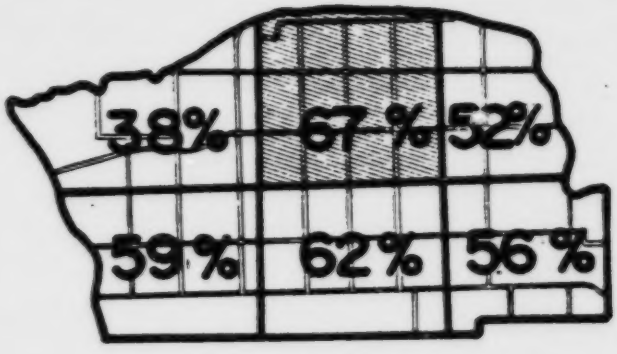
3) *If the development of the UJSM area is allowed to exceed 3500m^2 - say be permitted to go to 7000m^2 - then the area would attract approximately twice as much DSTM spending as is shown in Figure 5, thus reducing the south mountain residents' DSTM spending in Zone 26 (Limeridge Mall)*

Figure 5

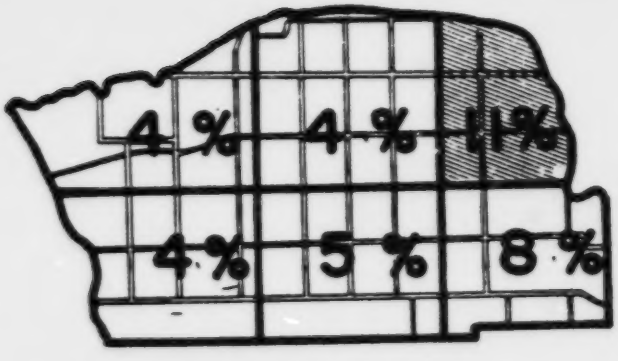
SCHEMATIC MAPS OF DSTM TRADE AREAS, 2001, SCENARIO 10 A, MOUNTAIN ZONES



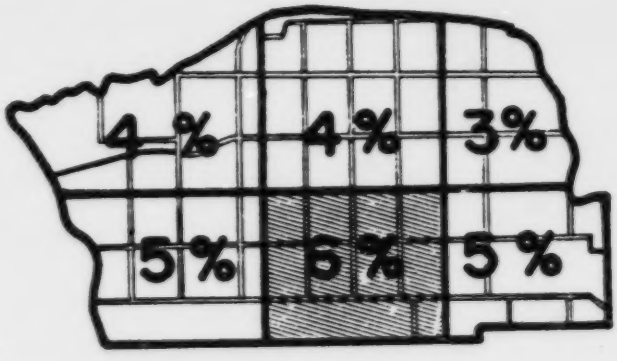
WHAT PERCENTAGE OF PURCHASES ARE MADE IN ZONE 25?



WHAT PERCENTAGE OF PURCHASES ARE MADE IN ZONE 26? (LIMERIDGE)



WHAT PERCENTAGE OF PURCHASES ARE MADE IN ZONE 27?



WHAT PERCENTAGE OF PURCHASES ARE MADE IN ZONE 29? (U.J.S.M.)

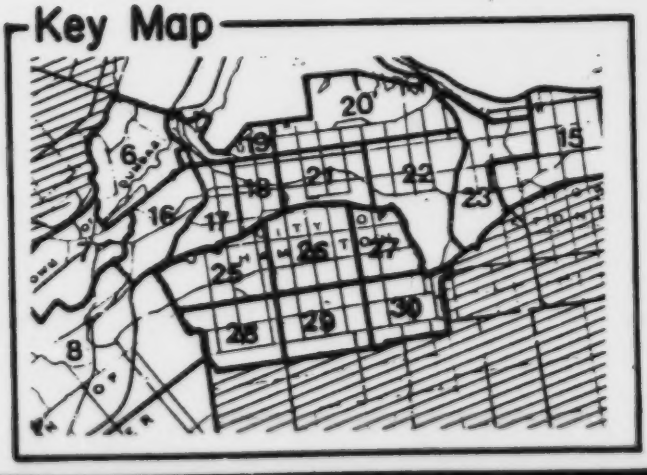


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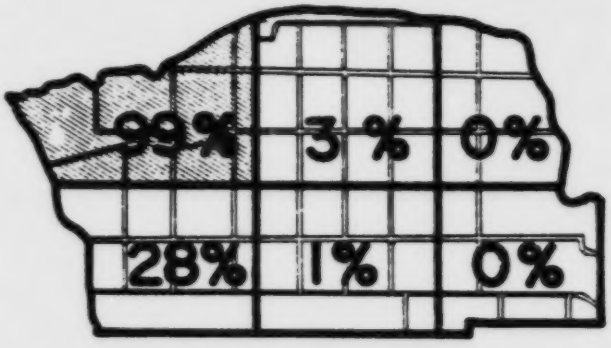
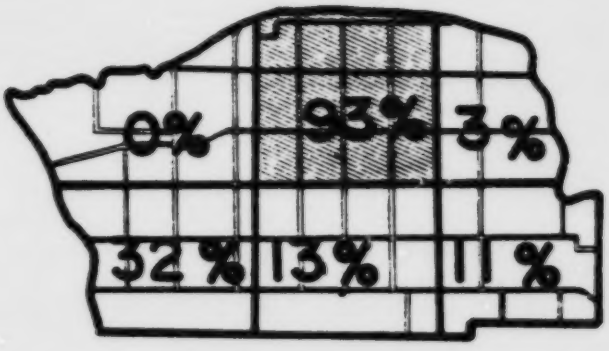
Figure 6

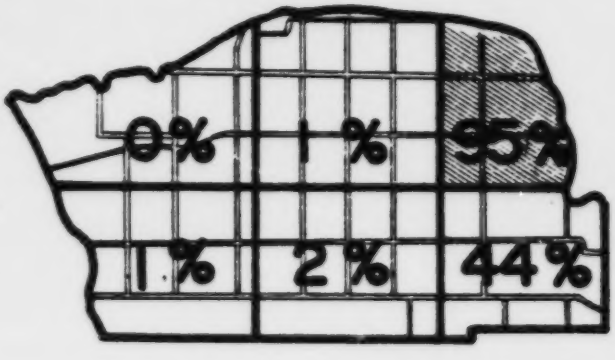
SCHEMATIC MAP OF FOOD TRADE AREAS, 2001, SCENARIO 10A, MOUNTAIN ZONES



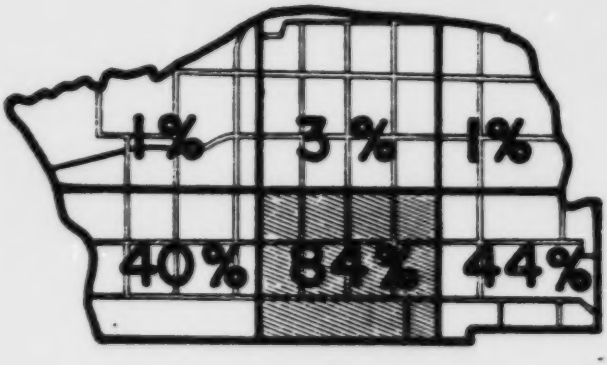
WHAT PERCENTAGE OF PURCHASES ARE MADE IN ZONE 25?



WHAT PERCENTAGE OF PURCHASES ARE MADE IN ZONE 26? (LIMERIDGE)

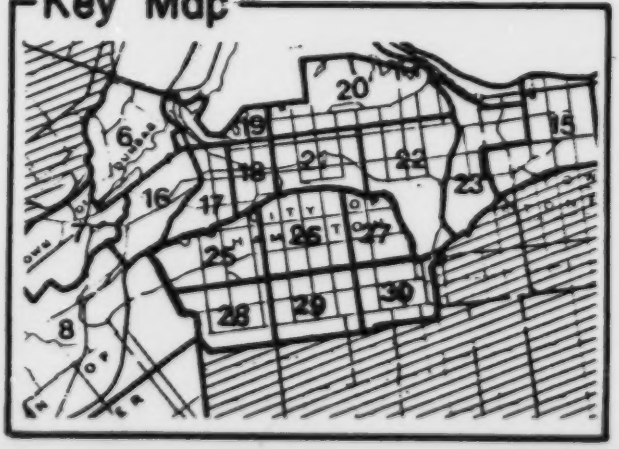


WHAT PERCENTAGE OF PURCHASES ARE MADE IN ZONE 27?



WHAT PERCENTAGE OF PURCHASES ARE MADE IN ZONE 29? (U.J.S.M.)

Key Map



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and reducing their food spending in Zones 25, 26 and 27 which will have a negative impact on the existing centres in those zones.

TYPE OF DEVELOPMENT

The final question for this scenario concerns the type of development which is required given that 3,500 m^2 of commercial facility can be profitably supported in the UJSM area. Actually, this comprises two questions.

First, should this development take the form of a strip or a mall? Although the model makes no judgement on this issue, the conclusions and the recommendations do discuss this issue.

Secondly, what should be the nature of the functions provided by this facility? The 3,500 m^2 is expected to be devoted to retail uses - about 4:1 (DSTM: food type) is the current ratio. In addition, space needs to be provided for automotive services (5), for food/beverage establishments (17), and for personal services (500 m^2). In addition parking has to be provided for the facilities.

CHAPTER 5

COMMERCIAL IMPACT OF HAMILTON CIVIC AIRPORT

INTRODUCTION

In addition to the typical commercial growth potential of the UJSM area as discussed throughout this report, it is necessary to review the impact which can be expected from the expansion of the Hamilton Civic Airport. The additional commercial demand associated with airport operations is not a well documented phenomenon nor has it been included as a function of the computer model. In order to ascertain the nature and extent of associated commercial activity, it has been necessary to review from a historical context the development of several other Canadian airports both in Ontario and beyond. From this research an analogy will be developed to predict the commercial impact of the Hamilton Civic Airport on the UJSM area based on the historical growth patterns in other areas.

DEVELOPMENT TRENDS IN OTHER AREAS

Research has shown that:

1. Commercial (and industrial) growth in the vicinity of airports is a function of the size and type of airport activity.

2. It is difficult to determine the correlation between economic development and airport activity.

3. Some studies indicate airport development has a larger positive impact on

development in the immediate vicinity of the airport but not as much in the larger regional area. Other studies show growth within 8 km of an airport is no greater than average suburban growth. Growth in the vicinity of an airport is often at the expense of other regional growth and often does not increase employment but rather is a relocation or redistribution of existing employment.

4. Commercial uses in the vicinity of airports are often service commercial type uses associated with other types of urban development, i.e. industrial or residential.

5. Larger airports which tend to serve larger geographic areas (i.e. Lester B. Pearson International, Chicago O'Hare) tend to stimulate some hotel development. Smaller regional airports (i.e. London, Windsor) tend to rely on existing hotel development in the CBD which are often only 15 or 20 minutes from the airport. This would also seem applicable in the local situation. Any near at hand motel-hotel development may be located not only due to airport proximity, but also near major Provincial highways or major regional transportation corridors to take advantage of automobile oriented tourist and commercial traffic.

6. Car rental agencies and taxi or limousine companies are often located within the airport or in extremely close proximity thereto.

7. Additional commercial demand generated by regional airport activities for restaurants and related services tend only to reinforce existing facilities rather than provide justification for new facilities. This can also be a function of short travel times to major existing facilities.

8. Several misconceptions exist about industrial locations near airports. However, statistics show industries and offices which have high air travel requirements are

2.5 times more likely to locate near an airport. Incoming air travellers dealing with these businesses often require hotel facilities near at hand.

9. Beneficial side effects of airport growth, other than air transportation improvements, are often overrated and less than originally anticipated. There are no clear cut, dominant side effects that can be contributed to airport growth.

10. Local travellers who utilize regional airports tend to live close enough (within 100 km) to travel either directly to or from home when using the airport and therefore do not require hotels and other services.

LOCAL APPLICATION

In order to address the anticipated commercial impact of Hamilton Civic Airport on the UJSM area it is necessary to develop a proper perspective, keeping in mind municipal jurisdictions, location, commercial and industrial land use designations and current development applications in the vicinity.

The Hamilton Civic Airport is located within the Township of Glanbrook approximately 4 km radius from the boundary of the City and the USJM area (See Figure 7). The major traffic artery through the study area to the airport area is Upper James Street – Highway 6. Along this arterial, certain commercial lands are designated for development at Ryckmans Corners and between Limeridge and Stone Church Roads within the City of Hamilton. Beyond the UJSM area in a southerly direction towards the airport, substantial acreage is designated in the Township of Glanbrook Official Plan (subject to approval) as "Highway Commercial", "Urban Industrial – Business Park", and "Village Industrial" and "Village Commercial". See Figure 8 for a composite of the various Official Plan designations discussed herein in both Hamilton and Glanbrook. As partially set out in

Chapter 2, several development applications are currently under consideration within the above designated commercial-industrial area and within both municipal jurisdictions. Dominion Stores Limited has made application to construct a 200-room hotel complex and 18,580 square metre shopping centre on a 9.35 hectare parcel at Ryckmans Corners within the Newburn Neighbourhood. A second major application has been made to construct a 100 room hotel-recreation-commercial complex on that potion of Lot 5, Concession 1 lying within the Township of Glanbrook. It is important to note that these two substantial development applications, which do not necessarily comply with the requisite official plans, would seem to be at least partially in anticipation of airport related commercial activity, especially the possibility of need for hotel space.

In order to develop a proper analogy, that is, the most likely development scenario caused by the expansion of Hamilton Civic Airport, it is necessary to highlight the preceding issues established in this chapter. They are:

- *the historic development trends at other airports*

- *the close proximity of the Hamilton Airport to the Central Business District in terms of distance and travel time*

- *the split municipal jurisdictions*

- *the two recent development applications*

In consideration of historic development trends in other similar areas, and especially in consideration of the Hamilton airport's regional status (not international) it would appear that the anticipation of substantial commercial and industrial growth in the Hamilton area based on airport impact, is probably overrated. The difficulty in correlating

Figure 7

UPPER JAMES SOUTH MOUNTAIN STUDY AREA

LOCATION MAP

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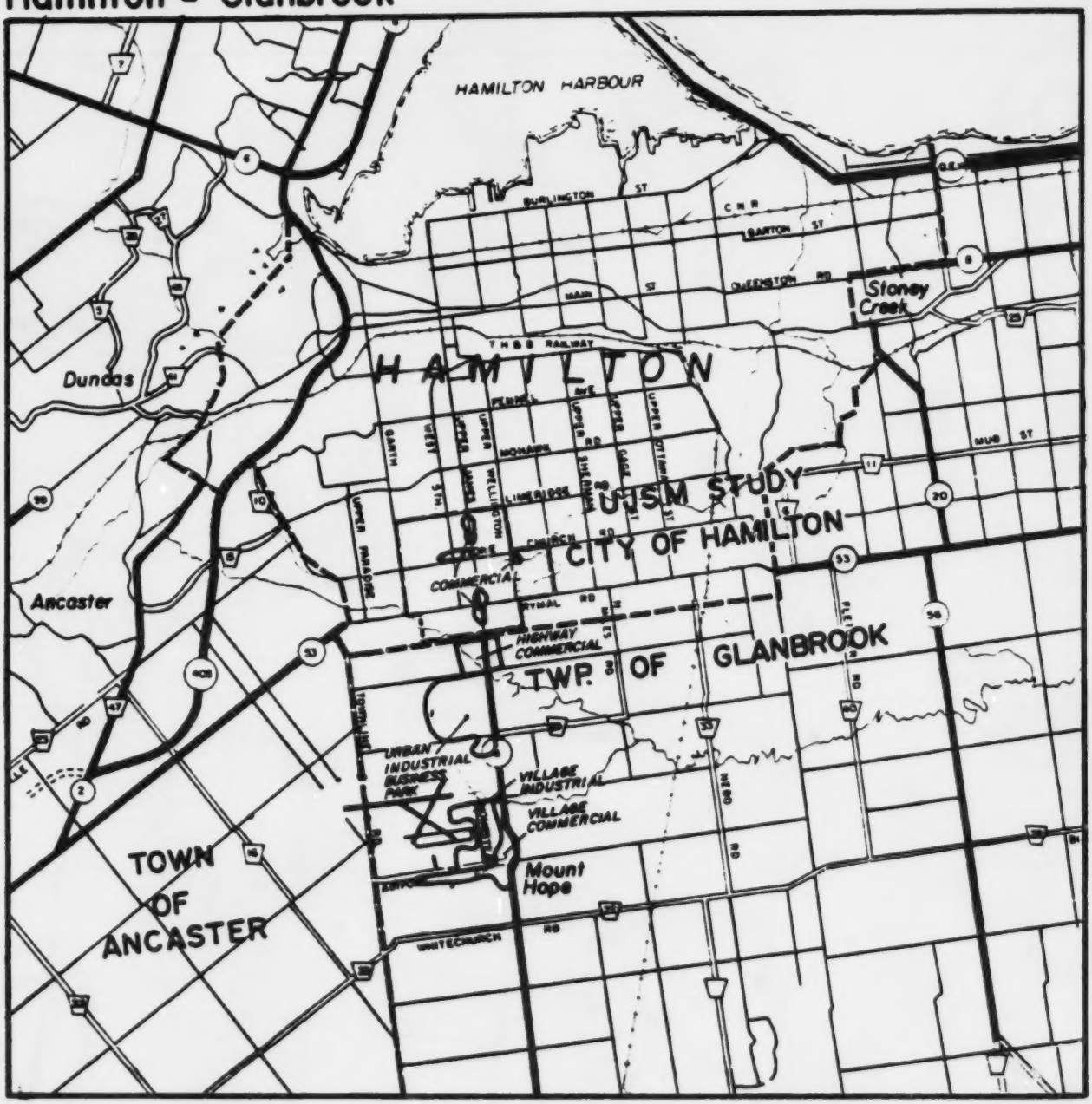
Figure 8

OFFICIAL PLAN COMPOSITE
Hamilton - Glanbrook



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airport development with economic activity together with contradictory evidence about growth around airports would support this assumption. With respect to hotel, restaurant and other periferally related commercial development, evidence would not seem to support substantial new developments near regional airports. In the case of Hamilton, this must be tempered with unknown factors such as the number and destinations of the air carriers that may use the facility and whether the flights are regularly scheduled or charter. The two development applications including approximately 300 hotel rooms would seem to be overly optimistic in relation to the airport, however, other demands may be realized from tourist and commercial traffic on Highway 6 (Upper James Street) and Highway 53 (Rymal Road). Existing or otherwise required restaurant and other facilities, again based on past trends in other areas, will likely have sufficient capacity to accommodate airport demand.

In considering commercial development related to airport activities, it is important to realize the close proximity of the airport in terms of distance and time to other commercial areas in the City and Region, especially the "Central Policy Area" as defined in the Hamilton Official Plan. This "Central Policy Area" is defined in part as the primary commercial centre in the City and Region beyond which Council will give preference to those commercial developments which do not jeopardize the primary commercial role of the "Central Policy Area." The primacy of the "Central Policy Area" is noted with particular reference to hotel and entertainment facilities located therein. The consideration of new hotel facilities around the airport must be undertaken with the utmost caution, so that any facilities such as the two current applications on Upper James Street do not seriously impact the hotel development in the "Central Policy Area." Any potential negative impact on downtown hotels must be avoided, especially in light of the difficulty in attracting national hotel developers to the downtown area in the past. Even in the case of Lester B. Pearson International, which is a considerable distance from downtown Toronto, and certainly much larger than the planned expansion of the Hamilton Civic Airport, major commercial development did not take place in the airport vicinity until the late 1960's,

approximately 15 to 20 years after its initial development.

The final issue which must be included in any prediction is the split municipal jurisdiction. To this point in time, development in both the UJSM area and Glanbrook has been subdued by two constraints, being the lack of municipal services and restrictive Official Plan policies in both municipal jurisdictions. New Official Plan policies, particularly in Glanbrook, will increase the competition for development along the Upper James Street-Highway 6 corridor.

FINDINGS

All of the above issues, when considered together, would indicate that the impact of the airport on commercial activity in the UJSM area will be insignificant and will only reinforce existing or otherwise required development during the plan period. It is recommended that prior to the approval of any new hotel development in or beyond the UJSM area on Upper James Street-Highway 6 the impact of such development be given very careful consideration, keeping in mind the "Central Policy Area" policies of the City of Hamilton Official Plan.

The findings contained in this chapter are realistic as this report is written, and are based on historic retail commercial requirements of similarily sized regional airports. However, as the expansion of the Hamilton Civic Airport will be significant in terms of air transportation requirements, the related commercial must be monitored very closely and this study updated as may be required. This should be done at least as often as the statutory 5 year Official Plan review.

CHAPTER 6

CONCLUSIONS

The analysis which has been carried out in this study concludes that a modest level of commercial development would appear to be appropriate for the purposes of planning in the Upper James Street area. However, as in any planning exercise, it is important to keep in mind the linkages between broad and large scale activities within the urban fabric and local site specific decisions. Although the resultant effects of extraneous broad-scale decisions on the localized scene are difficult to plan for, in our opinion it is prudent to at least be aware of extraneous factors which may impact negatively or positively on the micro level.

Specifically, broad changes in government policy, industrial development, socio-economic characteristics, public transportation, settlement patterns, commercial capacity, adjacent municipalities and government restructuring may bring about significant changes in the conclusion arrived at in the study. In order to account for the effects of these possible shifts, it is strongly recommended that a review of this commercial analysis be carried out in conjunction with the detemination of the need for revisions to the Official Plan as required under Section 26(1) of the Planning Act R.S.O. 1983. Such consideration will also be beneficial in providing direction for the preparation of secondary plans for the neighbourhoods involved and for the purposes of responding to commercial development applications.

In conclusion, it is our opinion that based on the commercial space needs projected by this study, an amendment to the Regional and City Official Plans to transfer the subject lands in the study area from Stage 2 to Stage 1 is not warranted.

APPENDIX

APPENDIX

This Appendix first describes briefly the model and its origin and then discusses in some detail the way in which the projections were made to create the scenarios. It separates the technicalities from the main body of the report.

In essence, we are required to predict the space requirements for five types of commercial activity. These are:

(i) food type shops (not eating places),

(ii) department store type shops (DSTM stores),

(iii) food and beverage establishments serving the local population (but not the population travelling through the south mountain),

(iv) automotive facilities,

(v) personal services.

These types of establishments are described in Chapter 3 (see Tables 3 and 4 below).

The approach can be used to estimate the need for additional space in the UJSM area for all five types of establisments. The steps are:

(i) estimate total space needs in the larger study area (Hamilton, Stoney Creek, Dundas and Ancaster)

(ii) allocate this space to each zone of the model (Figure 3)

(iii) estimate space requirements by subtracting the existing size of facilities from the allocation so that planned commercial development is not at the expense of existing facilities. Surveys of existing food type and DSTM facilities have been conducted by the Hamilton-Wentworth Planning and Development Department, (Secondary Plan Commercial Design Standards Study,) and so the the steps are easily followed for these types of establishments.

Since these data on existing facilities are not available for Food/Beverage, Automotive and Personal Service establisments, alternative methods were used to estimate demand for them. Personal Service space needs were simply added on to DSTM space needs in the same ratio as exists in current shopping centres. In the case of Food/Beverage and Automotive Facilities, the demand generated by the additional population of the study area was used to predict local sales and commercial space needs.

MODEL

At the centre of the analysis is a model which predicts the equilibrium size of commercial facilities in the parts of the study region. Traditional ways of modelling commercial facilities are described by Alan Wilson in Urban and Regional Models in Geography and Planning (Wiley, Chichester, 1974). In this project, we have used a more recent model, developed in the Geography Department at McMaster University. This

model has improved upon the models described in Wilson's book, first, by modelling links between trips made for different kinds of purposes and secondly, by modelling the way in which commercial centres expand or lose trade. This model is fully described in M. E. O'Kelly, Impacts of Multi-purpose Trip Making on Spatial Interaction and Retail Facility Size (Ph.D. Thesis, Department of Geography, McMaster University, Hamilton, 1981). Other publications which explain the theory and some applications of this model are M. J. Webber: Information Theory and Urban Spatial Structure (Croom Helm, London, 1979); and M. E. O'Kelly: "A model of the demand for retail facilities incorporating multi-stop, multi-purpose trips", Geographical Analysis, 13, 1981, pp. 134-148.

Standard models of traffic flow in cities assume that the trips are made for a single purpose only and have a single destination. In the summer of 1978, some 704 households in Hamilton, Dundas, Ancaster and Stoney Creek kept a travel diary for two weeks each. This data base, one of the largest and most detailed sets of travel data ever collected, is described in M. J. Webber, Urban Spatial Structure: An Information Theoretic Approach (Report to the Social Sciences and Humanities Research Council of Canada, Ottawa, 1978). An abbreviated description is given in the above references. These survey data cast doubt on the value of this standard assumption. From these data three components of multi-stop multi-purpose trips can be separated out: (1) the importance of multi-stop multi-purpose trips as a percentage of all travel; (2) the linkages between activities; and (3) the impact of complex trips on the spatial patterns of trip ends. Trip making involved multi-stop multi-purpose activity in at least 60% of the cases examined. The only purpose for which the simple single-stop single-purpose trip assumption is a reasonable approximation is for work trips. Shopping trips, in the 1978 study (as in previously reported studies) involve multi-stop purposes in over half of the cases. Important spatial and functional linkages are implied by this type of behaviour.

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The model used in this report represents the inflows of consumer dollars to Hamilton-Wentworth facilities in the presence of multi-stop multi-purpose trips. A conditional probability model (time-varying Markov model) was adapted to the problem and the probabilities of transition between locations for various purposes were defined; measures of the interdependence between activities were derived, conditional upon the location and purpose of the initial stop of the trip.

The model determines the share of each centre in the total expenditure for grocery and non-grocery shopping. The model finds the set of attraction terms (for both types of retailing at each location) which satisfy the following requirement: the attraction term in the spatial interaction equation should equal the share of the facility in total expenditure. In other words, the model balances the retail attraction terms with the total inflow to the facilities, where 'total inflow' means the demand allocated to the facility, taking multi-stop multi-purpose trips into account. The hypothesis embodied in this formulation is that the attraction terms are reflected in the total inflow to a location, and not merely in the first stop expenditures. Figure 3 in Chapter 3 illustrates the method of solving the model.

DATA SOURCES AND SCENARIOS

POPULATION FORECASTS

Six different population forecasts are used in this study. Three forecasts are taken from recent Hamilton-Wentworth Planning and Development Department publications, namely Hamilton-Wentworth Population Projections 1981 Review (Hamilton-Wentworth Planning and Development Department, September 1981), which provides High, "Most-Likely" and Low forecasts of the populations of the Region's municipalities for 2001, and

Allocation of 1981 Population and Employment Projections (2001) to Traffic Zones (Hamilton-Wentworth Planning and Development Department, June 1982), which forecasts zonal populations corresponding to the "most-likely" forecast.

One forecast - the Very High projection - is based on the forecast adopted by Regional Council in February 1976 and used in the development of the Regional Official Plan. It is described in Hamilton-Wentworth Planning and Development Department, Population Future Growth - Regional Official Plan Study. Four other forecasts were speedily prepared for this study using some methods outlined in F. T. Denton, C. H. Feaver and B. G. Spence, "Changes in the Population and the Labor Force: Implications for the Hamilton Region" (paper presented to the Economic Futures Conference: Western Lake Ontario Growth Corridor, Hamilton, 6-7 October, 1983). Of these, one corresponded to the Very High projection, one to the Low projection, and two were different from the others, being Medium High and Very Low. These six projections are given in Table 1 of Chapter 3; they have the following basis.

(i) Very High: Regional, Municipal and zone forecasts are all from the Hamilton-Wentworth Planning and Development Department Regional Official Plan Study.

(ii) Most Likely: Regional, Municipal and zone forecasts from Hamilton-Wentworth Planning and Development Department (June, 1982).

(iii) High: Municipality totals forecast by Hamilton-Wentworth Planning and Development Department (September, 1981). Zonal forecasts are derived in comparison to (ii) by placing the additional people in those zones where most vacant land is - i.e. the South Mountain, Ancaster and Stoney Creek.

(iv) Low: Municipality totals forecast by Hamilton-Wentworth Planning and Development Department (September 1981). In comparison to (ii), less population growth is anticipated in the fast growing areas of the South Mountain, Ancaster and Stoney Creek.

Projections (v) and (vi) are based on methods described in Denton et al (1983). First, they make four sets of assumptions about demographic variables in Canada:

a "normal" rate (which corresponds to the Low forecast of Hamilton-Wentworth Planning and Development Department)

- present rates of births per woman (1.7 lifetime)
- slowly declining mortality
- present rates of net immigration (80,000 per year);

a rate which corresponds to the Very High forecast, made by assuming that the birthrate rises to 3.0 lifetime;

a rate which is Very Low, made by assuming that the mortality rate remains constant;

a rate which is Medium High, made by assuming an increase in net immigration.

These assumptions combine to provide four predictions about the population of Canada in 2001. Next, the authors observe that there is a very high correlation between the rates of growth of the Canadian population and of the Hamilton census metropolitan area (core) population: hence CMA populations can be predicted from the Canadian ones. The Hamilton-Wentworth Region's population is then estimated from the CMA total by assuming

that Burlington and Grimsby populations grow at the Canadian rate (always higher than the CMA rate except in the Very High forecast).

(v) Medium High: Regional total as described above; zonal populations by interpolation between forecasts (ii) and (iii).

(vi) Very Low: Regional total as described above; zonal population estimates are obtained by supposing that there is some, but very slow movement of people from the city centre toward the fringes.

Three official population forecasts have been made for 1989, corresponding to the High, Most Likely and Low projections. Regional population estimates for 1989 are averaged from Hamilton-Wentworth Planning and Development Department estimates for 1986 and 1991. All municipal and zonal forecasts have been made specially for this study. Municipal forecasts are made in the following way:

let R1 = 2001 population - 1982 population

(i.e. total increase or decrease of population in the Region);

let R = 1989 population - 1982 population

(i.e. total increase or decrease of population in the Region);

then a = R/ R1 is the proportion of the total Regional population change that is forecast to occur by 1989. For each municipality, the 1989 population forecast (P_m) is obtained by:-

$$P_m = (1982\ population) + a*(2001\ population - 1982\ population).$$

These forecasts differ slightly from those made by the Hamilton-Wentworth Planning and Development Department.

Given these municipality estimates, 1989 zonal estimates are made by assuming that population increases take place largely on the mountain and decreases below the mountain, as suggested by the Regional Municipality's 2001 "most likely" forecast.

Thus, estimates of zonal populations are obtained.

INCOME DATA

Table 3 of Chapter 3 reports the average per capita income in each zone of the study area for the calendar year 1980. The source is Final Population Counts, Hamilton, 1976, 1981; 1981 Census of Canada (Statistics Canada, Catalogue 95-911) and 1981 Census of Canada: Hamilton Census Tracts - Selected Social and Economic Characteristics - Volume 3 (Statistics Canada, Catalogue 95-952).

Average per capita income equals the total income reported for 1980 by males and females 15 years of age or over who had some income, divided by total population (including children and others without income).

TRAVEL TIMES

Tables 4A and 4B of Chapter 3 report travel times. These times are aggregated

from travel time skims done by the Regional Planning and Development Department for this study. The existing network times assume not only the existing network but also the existing population; the projected times assume not only the North-South and East-West Freeways but also the Most Likely population projection.

The fact that this study does not recompute travel times for each population projection (which causes congestion to vary) means in effect that transport improvements are assumed to keep pace with increasing traffic flows.

EMPLOYMENT FORECASTS

The relative employment levels for each zone must be forecast. The Most Likely forecasts are provided by Hamilton-Wentworth Planning and Development Department (June 1982). The basis for the other projections is described in Chapter 3, Section 4. The numbers used to make the projections are:

for Low 2001: In the Region, the employee/population ratio falls from 0.5118 to 0.5000; in the suburban municipalities, these ratios actually rise to 1.05 times the Most Likely ratio (leaving 2300 jobs less than in the Most Likely projection). The City has 13,840 jobs less, mostly taken from zones 20 and 16;

for High 2001: In the Region the employment/population ratio rises to 0.5630, but the suburban ratio remains the same as in the Most Likely scenario.

EXPENDITURE AND SALES

Tables 1 through 6 provide the expenditure and sales data upon which these

scenarios are based. All data are in constant 1971 dollars unless otherwise noted.

Tables 1 and 2 show expenditures per capita on food and DSTM for 1971 - 1982. There is no significant trend to either of these series.

Tables 3 and 4 report the sales per square foot for food and DSTM in Canadian regional shopping centres.

Both expenditures per capita and sales per square metre are likely to rise over the next 17 years. For planners the crucial question is how fast sales per square metre rise in relation to expenditures per capita because that gives the amount of space needed to serve each person. The high, medium and low assumptions made about the rate of increase of sales per square metre in relation to expenditures per capita are stated in Tables 5 and 6. We know of no good recent data upon which to base such projections.

TABLE 1

FOOD EXPENDITURES PER CAPITA, ONTARIO 1971-1982

	Current Dollars	Constant 1971 Dollars*	Percent of Personal Income per Capita
1971	$ 361	$ 361	8.98
1972	379	352	8.50
1973	417	338	8.27
1974	487	340	8.33
1975	610	377	9.25
1976	619	372	8.39
1977	659	366	8.20
1978	726	349	8.32
1979	789	335	8.21
1980	852	344	8.04
1981	1,042	375	8.22
1982	1,144	367	8.26

*deflated via food price index. 1971 = 100
Sources: Statistics Canada. Retail Trade. Estimates of Population for Canada and the Provinces

Dept. of Finance. 1981 Economic Review

If y = expenditure, constant 1971 dollars and
x = 1, 2..... 12 for 1971 to 1981, then

$$y = 352.0 + 0.699x$$

with t = 0.53. The trend is not significant.

TABLE 2

DSTM EXPENDITURES PER CAPITA. ONTARIO 1971-1982

	Current Dollars	Constant 1971 Dollars	Percent of Personal Income per Capita
1971	$ 624	$ 624	15.52
1972	693	661	15.54
1973	750	665	14.87
1974	836	669	14.31
1975	897	648	13.60
1976	1,007	676	13.65
1977	1,061	660	13.20
1978	1,154	659	13.22
1979	1,250	654	13.01
1980	1,357	670	12.80
1981	1,501	612	11.84
1982	1,568	578	11.33

*deflated via the Consumer Price Index. 1971 = 100

Sources: Statistics Canada. Retail Trade. Estimates of Population for Canada and the Provinces

Dept. of Finance. 1982 Economic Review

If Y = expenditure. constant 1971 dollars and
x = 1, 2..... 12 for 1971 to 1982. then

$$y = 670.0 - 3.39x$$

with t = 1.47 which is not significant at 0.05.

TABLE 3

DSTM SALES PER SQUARE FOOT IN CANADIAN REGIONAL SHOPPING CENTRES

Type of Store	(1) Median Sales Per Sq. Ft.	(2) Sales Per Sq. Fot. of Top 10% of DSTM Stores	(3) Sales Per Sq. Ft. of Top 2% of DSTM Stores	(4) Median Store Size	(5) No. of Stores in Sample	(6) Total Square Footage	(7) Median Sales (1) x (6)	(8) Top 10% Sales (2) x (6)
Department Store	$ 81.38	$ 139.38	$ 239.93	123,054	30	3,691,620	$300,424,035	$514,537,996
Jr. Dept. Store	48.16	114.79	174.34	25,918	19	492,252	23,706,858	56,505,607
Ladies Specialty	133.99	202.23	340.17	932	53	49,396	6,618,570	9,989,353
Ladies Ready to Wear	113.17	225.74	309.82	2,437	192	467,904	53,336,377	105,624,649
Maternity	87.38	251.24	257.07	1,036	8	8,238	719,836	2,069,715
Millinery	144.24	348.00	443.74	767	5	3,835	553,160	1,334,580
Children's Wear	96.71	141.84	172.02	2,420	25	60,500	5,850,955	8,569,220
Men's Wear	126.66	207.72	258.09	2,790	79	220,410	27,917,130	45,783,565
Family Wear	116.37	179.99	275.99	6,296	12	75,552	8,791,986	13,598,604
Unisex/Jean Shop	178.13	370.88	540.22	1,196	46	55,016	9,800,000	20,404,334
Leather Shop	204.57	319.27	537.90	948	16	15,168	3,102,918	4,842,687
Family Shoes	102.11	186.42	234.76	2,105	93	195,765	19,989,564	36,494,511
Ladies Shoes	135.87	332.56	406.00	1,579	21	33,159	4,498,682	11,027,357
Men's, Boy's Shoes	106.07	205.32	239.30	1,560	5	7,800	827,346	1,601,496
Children's Shoes	185.40	194.38	197.29	1,188	9	10,692	1,768,456	2,078,311
Furniture	99.82	180.45	239.63	2,795	15	41,925	4,184,953	7,565,366
Lamps	71.77	102.61	132.42	2,400	11	26,400	1,894,728	2,708,904
Curtains, Drapes	90.59	141.00	149.99	2,611	17	44,387	4,021,018	6,258,567
China, Glassware	121.90	198.26	367.81	1,691	16	27,056	3,298,126	5,364,123
Appliances	138.29	276.20	295.04	604	6	3,264	501,525	1,000,948
Radio, TV, HiFi	189.98	347.63	599.96	1,323	33	43,659	8,294,336	15,177,178
Sewing Machines	196.43	396.02	470.41	2,647	8	21,176	4,159,602	8,386,120
Records, Tapes	207.36	380.87	391.80	1,379	21	28,959	6,004,938	11,029,614
Music Instruments	96.27	256.43	333.28	1,558	15	23,370	2,249,830	5,992,769
Paint, Wallpaper	117.58	229.42	301.29	1,482	15	22,230	2,613,803	5,100,006
Hardware	98.45	280.57	349.73	5,611	10	56,110	5,524,029	15,742,783

TABLE 3 - DSTM SALES PER SQUARE FOOT IN CANADIAN REGIONAL SHOPPING CENTRES - Continued

Home Improvements	55.38	100.14	135.65	1,760	6	10,560	584,812	1,057,478
Automotive TBA	50.54	N.A.	N.A.	8,857	4	35,428	1,790,531	N.A.
Sporting Goods	128.95	175.70	255.91	2,236	14	31,304	4,036,850	5,500,113
Hobby	136.03	208.34	251.04	630	10	6,300	856,989	1,312,542
Art Gallery	140.30	286.27	336.34	910	12	10,920	1,532,076	3,126,068
Cameras	282.07	404.17	492.15	756	23	17,388	4,904,633	7,027,708
Toys	95.16	150.65	188.81	2,221	17	37,757	3,592,579	5,688,092
Arts, Crafts	131.94	177.23	203.79	772	19	14,668	1,935,295	2,599,610
Imported Gifts	183.94	269.57	317.62	715	13	9,295	1,709,722	2,502,865
Luggage, Leather	157.92	200.67	213.94	1,211	11	13,321	2,103,652	23,284,177
Cards, Gifts	111.85	179.83	323.51	1,148	29	33,292	3,723,710	5,980,242
Books, Stationery	108.12	272.32	305.83	2,591	33	85,503	9,244,584	23,284,177
Credit Jewelry	179.85	222.80	236.81	2,305	9	20,745	3,584,114	4,621,988
Costume Jewelry	120.87	352.31	508.77	494	12	5,928	715,332	2,088,494
Jewelry	179.85	349.29	575.95	1,541	45	69,345	12,457,829	24,221,515
Cosmetics	148.02	479.77	489.94	454	8	3,632	541,241	1,742,525
Yard Goods	116.87	151.51	163.83	3,330	17	56,610	6,604,688	8,576,981
Tobacco	213.92	1,117.39	1,479.00	620	18	11,160	2,387,347	12,470,072
Flowers	139.54	316.08	376.70	944	14	13,216	1,844,165	4,177,313
Other DSTM	135.13	348.17	1,411.02	518	58	30,044	4,059,846	10,460,419
TOTALS						6,242,619	576,862,564	1,047,598,359

N.A. - Not Available

SOURCES: Urban Land Institute - Dollars and Cents of Shopping Centres, 1978, Pages 194 219

TABLE 4

FOOD SALES PER SQUARE FOOT IN CANADIAN REGIONAL SHOPPING CENTRES

Type of Store	(1) Median Sales per sq. ft.	(2) Number of Stores in Sample	(3) Median Store Size (Sq. ft.)	(4) Total Square Footage (2)x(3)	(5) Sales ($M) (1)x(4)
Supermarket	$264.57	26	30,163	784,238	207.485
Meat, Fish Poultry	181.95	10	431	4,310	0.784
Specialty	178.57	19	799	15,181	2.711
Delicatessen	152.43	14	1,519	21,266	3.242
Bakery	180.39	10	1,157	11,570	1.087
Canadian Nuts	276.94	38	578	21,964	6.083
Health	259.39	12	532	6,384	1.656
TOTAL				854,913	224.048

SOURCE: Urban Land Institute: Dollars and Cents of Shopping Centres. 1981. (1981 dollars).

TABLE 5

ASSUMED SALES PER SQUARE METRE, DSTM

	High Assumption	Medium Assumption	Low Assumption
1987	554.3	554.2	554.3
1989	571.2	554.3	538.0
2001	588.1	554.3	522.1

Data are in constant 1971 dollars.

TABLE 6

ASSUMED SALES PER SQUARE METRE, FOOD TYPE STORES

	High Assumption	Medium Assumption	Low Assumption
1980	1138.9	1138.9	1138.9
1989	1164.8	1138.9	1110.7
2001	1200.3	1138.9	1077.9

Data are in constant 1971 dollars.

PROPENSITY TO TRAVEL

Average travel times from home to both food type and DSTM facilities must be estimated. These are projected in the following way. From the 1978 survey it was found that actual average travel times to these facilities in Hamilton were $\bar{c}_F$ and $\bar{c}_D$. Given the actual location of commercial facilities and people then, the most efficient (least time) travel patterns would have needed average travel times of c_F and c_D, respectively. The ratios by which the actual travel times exceed the minima are assumed to be constant over time. Thus,

$$\text{If } r_F = \bar{c}_F / c_F$$

$$\text{If } r_D = \bar{c}_D / c_D$$

If c_F (1989) and c_D (1989) are the 1989 efficient travel times then the predicted average travel times are

$$c_F \text{ (1989)} = r_F \; c_F \text{ (1989)}$$

$$c_D \text{ (1989)} = r_D \; c_D \text{ (1989)}$$

And similarly for c_F (2001) and c_D (2001).

FOOD/BEVERAGE, AUTOMOTIVE NEEDS

The expenditure data for both types of establishment are from Statistics Canada, Family Expenditure in Canada, 1978, Vol. 2, (Ottawa, 1981), Tables 2 and 20. These are for all types of families in sixteen cities in Canada (Hamilton was not included). These expenditures are converted to 1971 dollars using the Consumer Price Index and to per capita values by assuming 2.75 individuals per family (the average of all families in the survey).

In 1978 the average urban family in the Family Expenditure survey consumed $615.00 of services in local food/beverage establishments, that is $127.58 per capita in 1971 dollars. People have been eating out more as time has gone on, but we assume it to be constant (to be conservative). About one half of this is likely to leak to non-local zones - spending near work at lunchtime, higher class restaurants in larger centres, spending on shopping trips - leaving an estimated $60.00 per capita to be spent locally in the study area by zone 29 residents.

The estimated 1984 sales per food/beverage establishment is obtained as follows. In Dundas, $60.00 sales by each of the 19,600 residents gives an expenditure of $1.18M (1971 dollars). The existing 20 food and beverage establishments thus average sales of $59,000 each. This figure is projected to 2001.

Transport consumed $2,334.80 per family surveyed in 1978. Of this, $907.70 was spend on buying trucks and cars. Since dealerships tend to congregate spatially, it is assumed that the UJSM study area will be able to support no more than

one small dealership - as similar suburban areas do now. Spending on gas, oil, lubrication, tires, batteries, maintenance and other services totalled $701.50 in 1978 dollars. It is supposed that much of the maintenance (two thirds) and one quarter of the gas purchases are made non-locally, leaving $515.40 per family or $107.10 per capita in 1971 dollars to be spent in the study area by zone 29 residents.

The 1978 mean family income was $12,107.31 (1971 dollars). Gas, which accounts for two thirds of the purchases in the automotive categories considered here, yields about 10% net income on sales. So, to support an owner-manager and two workers, each making the mean family income, a gas station must sell $363,000 worth of gas. Although a higher return is made on parts and repairs, such stations employ more people than "pure" gas stations, so the $363,000 per outlet is assumed to continue to 2001.